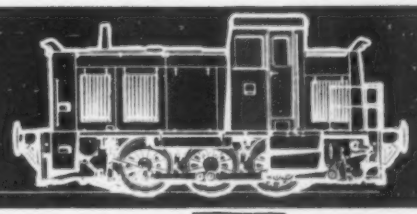
IRON & COAL

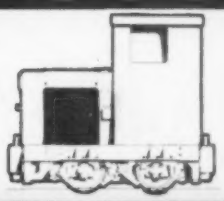
THE IRON AND COAL TRADES' REVIEW

VOL. 163 No. 4251 — Office: John Adam House, 17/19, John Adam Street, London, W.C.2 — LONDON: FRIDAY, SEPTEMBER 15, 1961 — Registered as a Newspaper. Single copies 1s. By post 1/4. Ann. Subscr. 52s. (Abroad 60s.)

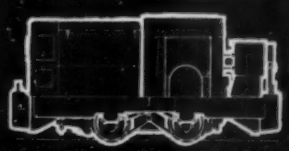
ABOVE



OR



BELOW



Whatever the job may be — underground haulage, narrow-gauge surface work or shunting — there is a Ruston locomotive that is just right for the duty.
Worth remembering too that Ruston locos are engined *and* built by Ruston — with dependability proved again and again in industry and public services throughout the world.

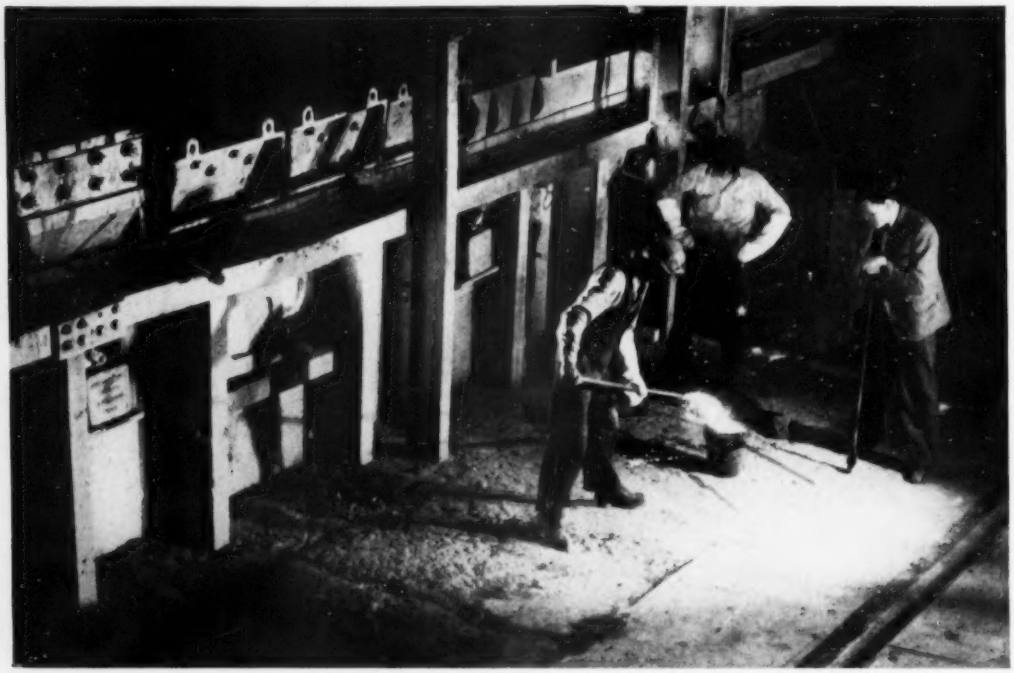
Diesel-electric, diesel-hydraulic and diesel-mechanical shunters:
7½ — 44 tons.

Narrow-gauge surface and naked-flame mines locos:
3½ — 10 tons.

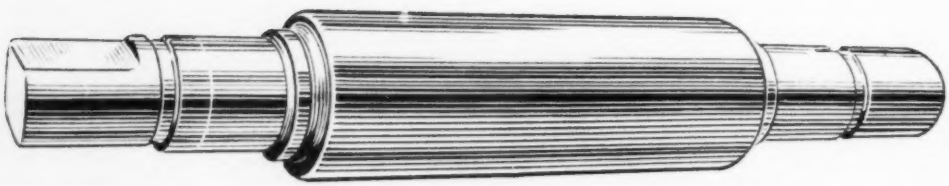
Flameproof diesel locomotives for underground haulage:
6 — 7 tons.

RUSTON *diesel locomotives*

RUSTON & HORNSBY LTD · LINCOLN · ENGLAND Associated with Davey, Paxman & Co. Ltd., Colchester.



DAVY-UNITED ROLLS



In a modernly equipped foundry
Davy and United Roll Foundry Limited
make all types of chilled, grain, steel base and
cast steel rolls for the rolling of ferrous
and non-ferrous metals.

DAVY-UNITED | **DAVY-ASHMORE GROUP**

DAVY AND UNITED ROLL FOUNDRY LIMITED · MIDDLESBROUGH

LONDON · SHEFFIELD · STOCKTON · GLASGOW · HULL · PARIS · MONTREAL · MELBOURNE · SYDNEY · JOHANNESBURG · SALISBURY · CALCUTTA · BOMBAY

747

ELECTRICALLY CONTROLLED Railway Sidings

by SUMMERSON'S

This sidings contract for the North West Gas Board, Mersey Group, had to be laid without disturbing existing gas production. As Consulting Engineers working with the Gas Board engineers, Summerson's surveyed and designed the layout and drew up a specification. As main contractors, Summerson's manufactured and installed the track which consisted of two different designs. One, involved 8,100 yards of track which included 41 turnouts, 12 tandem turnouts and 3 single cross overs, the other consisted of 765 yards of fully guarded track for fixing in concrete to top rail level, including a scissors cross over and turnouts. The main coke sidings have electro-pneumatically operated switches to direct wagons which move from the tippler tables by gravity, into the correct road. Just another example of how Summerson's experienced "know how" enables a difficult installation to be successfully carried out.

MAIN CONTRACTORS: Thomas Summerson & Sons, Ltd. CIVIL WORK: Leonard Fairclough Ltd. ELECTRO-PNEUMATIC EQUIPMENT: Westinghouse Brake & Signal Co. Ltd.

THOMAS SUMMERSON & SONS, LTD., MOWDEN HALL, DARLINGTON, CO. DURHAM. Telephone: DARLINGTON 5226

London Office: 5a, Dean's Yard, S.W.1. Abbey 1365

CLOSURES

Circular, specially reamed ends ensure gas tight closures with rubber bungs. Porous alumina plugs to prevent iron oxide carry-over also available.

For use in any high temperature furnace, particularly for carbon and sulphur determination in steel, operating at temperatures up to 1500°C. (2732°F.). These tubes are completely reliable, do not devitrify or allow loss of combustion gases even up to maximum working temperatures. Thermal aluminous porcelain 525 sheaths are excellent for use as pyrometer sheaths up to 1500°C.

all BRITISH T S L ...the BEST

THE THERMAL SYNDICATE LTD.

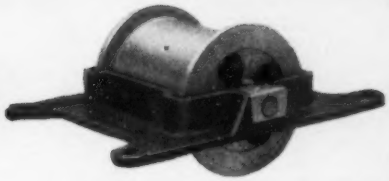
P.O. Box No. 6, WALLSEND, NORTHUMBERLAND. *Telephone: Wallsend 62-3242/3*

LONDON: 9, BERKELEY STREET, W.1. *Telephone: HYDe Park 1711/2*

Follsain-Wycliffe

FOUNDRIES LTD

'CY' Multiple Rollers mounted in Malleable Iron Frame



'CY' Rollers to NCB Spec. P110/1954 mounted in Malleable Iron Frame with renewable 'Wynite' bearings. 14 ranges of sizes available, also supplied with Ball or Oilite bearings.

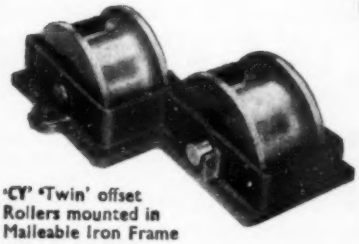
CY REGD

'CY' Haulage Surge Wheel Segments

abrasion-resisting alloy outlasts chilled iron by 3-5 times

other applications include
STOWAGE & WASHERY, PIPE BENDS & INSERTS & LINER PLATES

'CY' Brake Blocks for Shunting or underground Loco's



'CY' 'Twin' offset Rollers mounted in Malleable Iron Frame

'CY' Angle Rollers mounted in Malleable Iron Frame

FOLLSAIN-WYCLIFFE FOUNDRIES LIMITED

Lutterworth nr Rugby

Tel: Lutterworth 10, 60, & 152

THE MORRIS "GLYDEX"

PATENT NO. 720353

PIT TUB PEDESTAL

THE LAST WORD IN PEDESTAL DESIGN AND EFFICIENCY

Study these features :

- Frictional resistance and starting effort reduced to an absolute minimum, providing a considerable saving in haulage power.
- No wastage of grease due to edge of bearing scraping excess lubricant off the axle and dropping it on roadway.
- Ingeniously designed interior recesses and pockets automatically allow grease applied to axle to be drawn into bearing and deposited in the storage pockets.
- Bearing seat so arranged that the axle only collects enough grease from storage pockets for efficient lubrication.
- Interior shape of bearing allows sufficient grease to creep to outer bearing face for lubrication of wheel boss.
- Position of legs arranged to give ample space for operation of automatic greasers.
- Wheels can be removed without taking Pedestals off the Tub.
- Axles retained in position by our "SIM-PLOK" Lock Bolt.
- Pedestal designed to give maximum strength for minimum weight.
- Made of Toughened Cast Steel for long service under arduous conditions.

On receipt of particulars of what you are now using we shall be pleased to submit a quotation.

ROBERT MORRIS LIMITED · FARNWORTH · BOLTON

TELEPHONE: FARNWORTH 750 I

Surface re-organisation

Sutcliffe service and equipment covers a wide range, including complete surface reorganisation schemes, washery conveyors, dirt disposal equipment and automatic skip discharge. Our unrivalled experience in surface conveying can be brought to bear effectively on *your* particular problem—send for our leaflet "Surface Handling", ref: IR/141 for full details.

1 Skip discharge equipment
2 Dirt disposal equipment
3 A washery conveyor

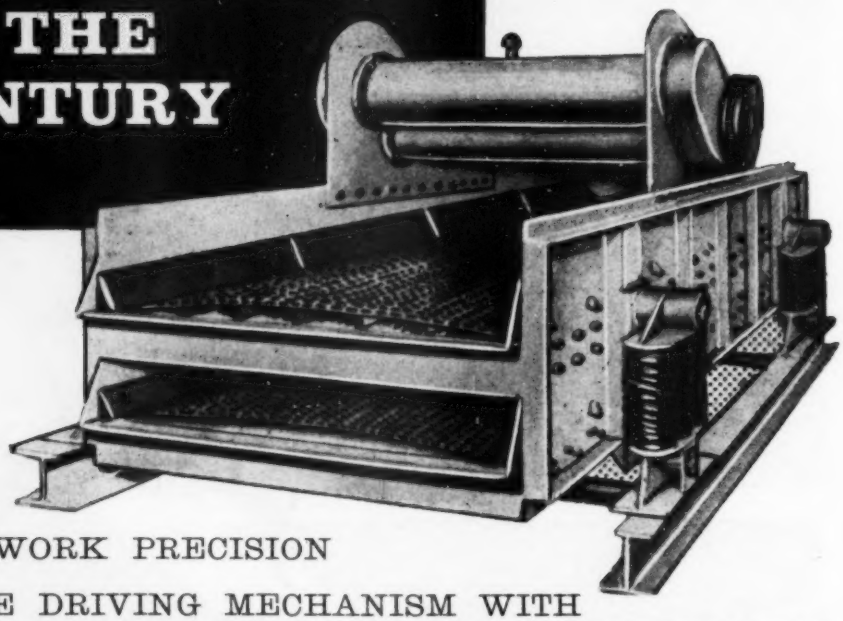
Photographs by courtesy of the National Coal Board.

Sutcliffe equipment takes good care of your coal

RICHARD SUTCLIFFE LTD., HORBURY, WAKEFIELD, ENGLAND

RS. 141

"LECCO-VIB" THE SCREEN OF THE CENTURY



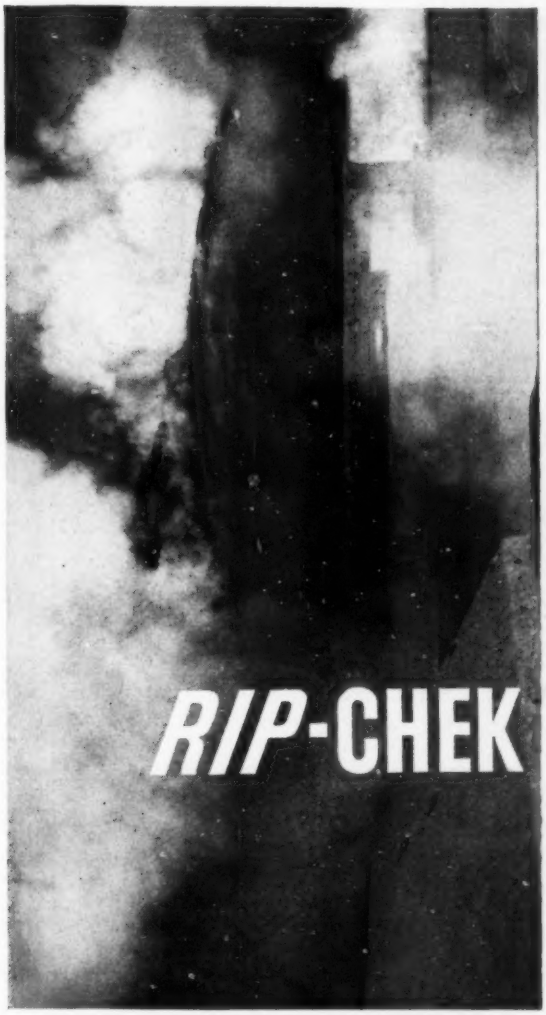
- CLOCKWORK PRECISION
- UNIQUE DRIVING MECHANISM WITH RESULTANT **EXTREME** LOW POWER CONSUMPTION
- EFFICIENT FOR BOTH 'DRY' AND WET SCREENING
- MODELS FROM 3′ x 1′ 6″ to 24′ x 9′

MACHINES FOR HANDLING LARGE AND SMALL MATERIAL

DEVELOPED AND TESTED UNDER THE HAZARDOUS CONDITIONS OF THE IRON ORE INDUSTRY OF THE MESABI RANGE AND PROVEN TO BE WITHOUT EQUAL

unifloc

UNIFLOC LTD, SWANSEA, GREAT BRITAIN. TEL: 55164 (3 lines) GRAMS: UNIFLOC S. WALES



(BELOW) *Magnetic extraction of jagged pieces of mould flash — a dangerous "passenger" on any belt but no hazard for BTR Rip-Chek.*

BTR

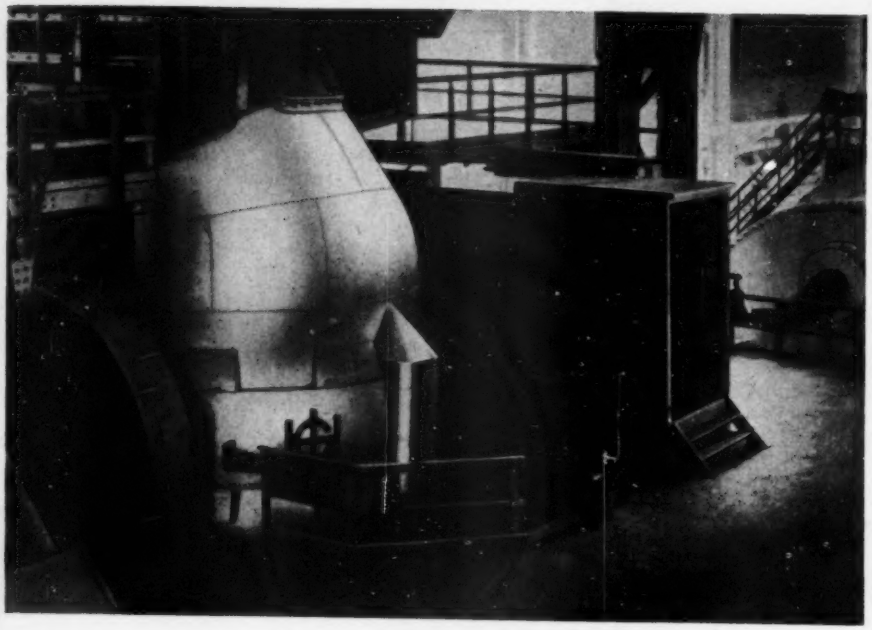
beats the knockout!

Hot sand, hot metal . . . 200 tons of it an hour . . . Rip-Chek belting meets and beats it easily at this Midlands foundry. BTR Rip-Chek wins easily on points—points such as heat-resistance, flexibility and troughability; but most important of all is the *check* in Rip-Chek—the transverse steel wires built into the carcase of the belt throughout its length. Install BTR Rip-Chek in your foundry . . . it will repay you with long, trouble-free service.

BTR Industries Ltd
HERGA HOUSE, VINCENT SQUARE, LONDON S.W.1

BTR ENGINEERS IN RUBBER AND PLASTICS

I/3628



Completely welded 60 ton converter for oxygen-blowing steel works.

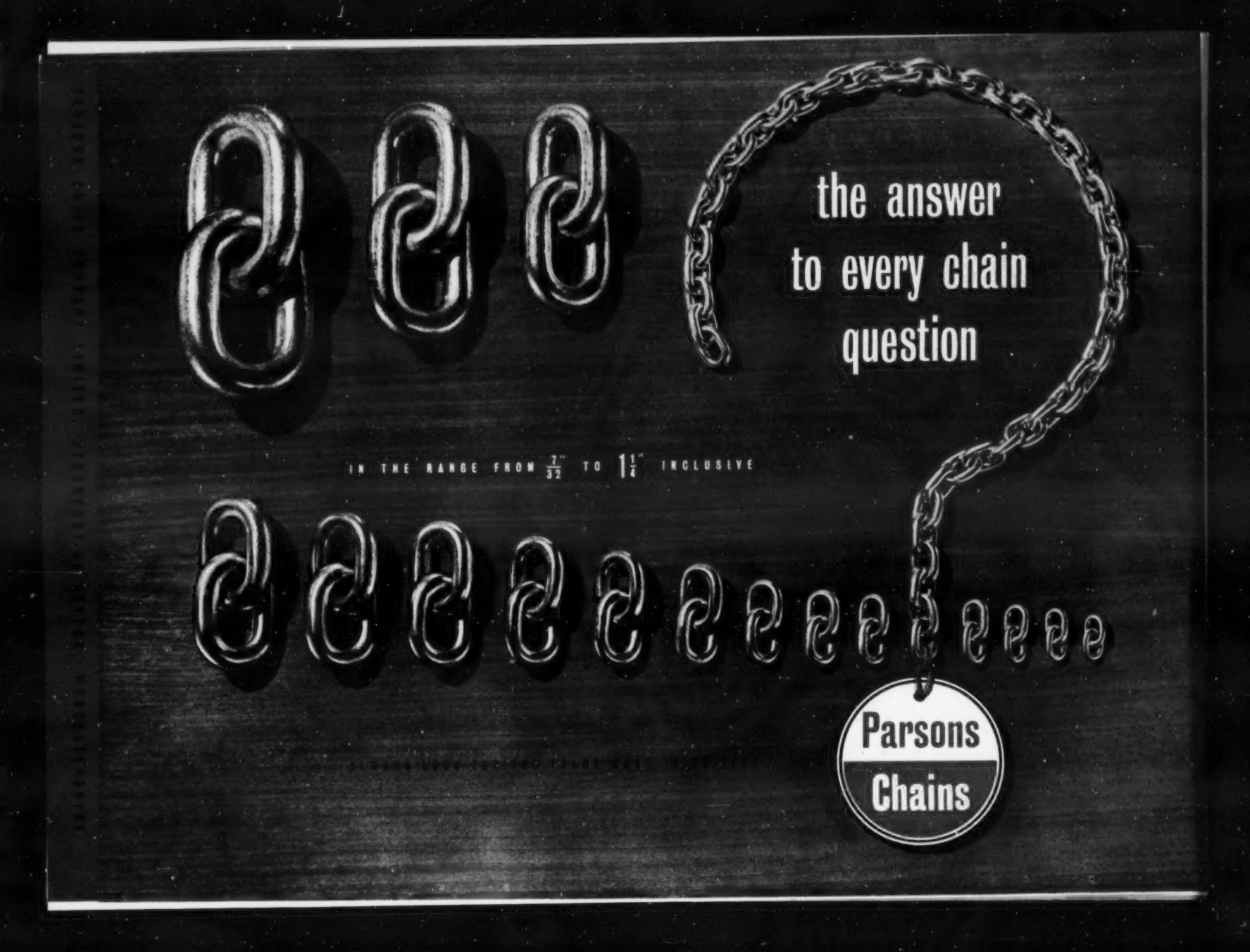
GHH carry out the design, construction and delivery of steelworks equipment, for the new oxygen steelmaking techniques, in all parts of the world.

●

GUTEHOFFNUNGSHÜTTE
STERKRADE AKTIENGESELLSCHAFT
STERKRADE WORKS · GERMANY

Sole Agents in the United Kingdom :
DOLLERY & PALMER LTD. · 54, VICTORIA STREET, LONDON, S.W.1
Tel VICtoria 2494
and LYDGATE LANE, SHEFFIELD
Tel. 64516

IMPERIAL CHEMICAL INDUSTRIES LTD.
LONDON, S.W.1.


the answer
to every chain
question
IN THE RANGE FROM 7/32" TO 1 1/4" INCLUSIVE
Parsons
Chains

NO 'SIXES AND SEVENS'!

The term 'sixes and sevens', which stands for confusion and general mayhem, has acquired an entirely new meaning since the introduction of the Huwood ML/7 Loader. With its slightly older and taller sister, the ML/6, it is making a formidable attack on the problem of low seam mechanisation. The ML/6 is 1′ 9″ in height, the ML/7 is 1′ 4½″ in height and of slightly greater width. Both offer the advantage of requiring a low capital investment appropriate to the seams in which they are used. Both minimise coal degradation. Both are hydraulically propelled and both are noted for quiet and efficient production.

The difference between 'sixes and sevens' and 'ML sixes and sevens' is something much appreciated in the mining industry of today.

HUWOOD ML/6 LOADER ON THE FACE

HUWOOD ML/7 LOADER

HUGH WOOD & CO. LTD.

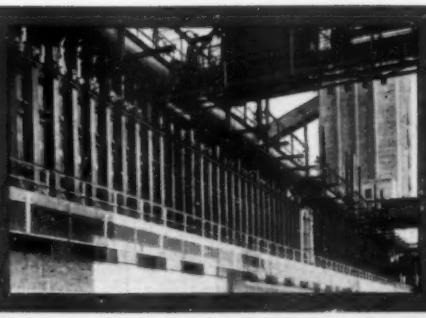
Head Office and Factories:
GATESHEAD - ON - TYNE, 11.
Telegrams: Huwood, Gateshead. Telephone: Low Fell 76083 (5 lines).

Industrial and Export Office:
ROYAL LONDON HOUSE, FINSBURY SQUARE, LONDON, E.C.2.
Telegrams: Huwood Stock, London. Telephone: Monarch 3273 (4 lines).

ML/EA/235

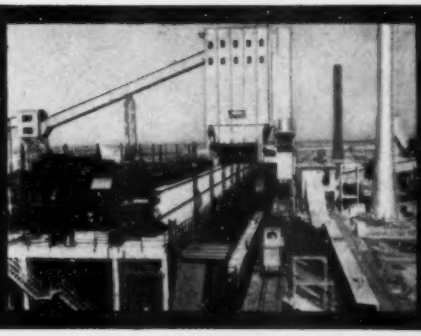
THIS MAN HAS SEEN IT

BRITAIN



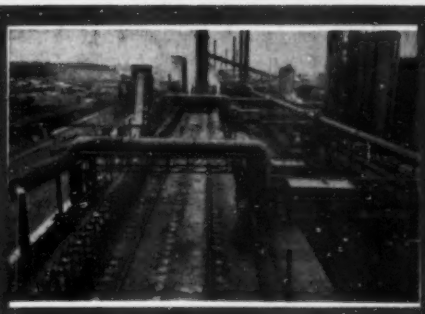
This coke oven and by-product plant was commissioned late in 1959 at the Abbey Works of the Steel Company of Wales. The 50 ovens supply 2,of tons of coke each day to the blast furnaces.

INDIA



As a member of the British Consortium building the Durgapur Steelworks in India, one of Simon-Carves' jobs is the design and construction of the complete coke oven and by-product plant. This is No. 1 battery just before it was commissioned.

AUSTRALIA



More than one ton of coal each day will be the throughput of this large installation Simon-Carves are building in Australia. The two 40-oven batteries, the complete by-product plant and the crude benzole and benzole rectification plants are included in the contract.

ALL BEFORE

All coking plants look something like this during construction. To the uninitiated, it may appear to be an untidy jumble of earthworks and concrete, but this experienced site engineer sees only the sturdy lines of another huge Simon-Carves coking plant taking shape. You have to be interested in steelworks coking plants for a job like this, but if you are then Simon-Carves is your firm. Plants are going up at steelworks in Australia, India and Britain, each one specially designed to suit the individual requirements of a particular steelworks.

COMPLETE COKE OVEN & BY-PRODUCTS PLANTS BY

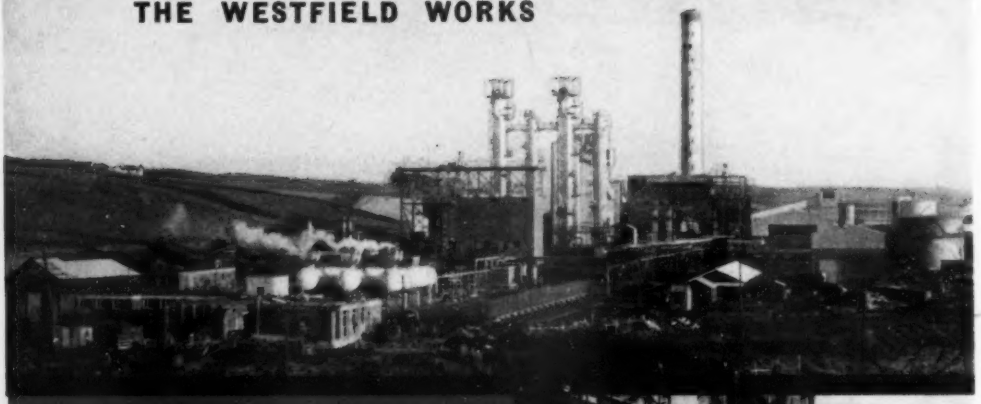
Simon-Carves Ltd

MEMBER COMPANY SE SIMON ENGINEERING LTD

CHEADLE HEATH, STOCKPORT

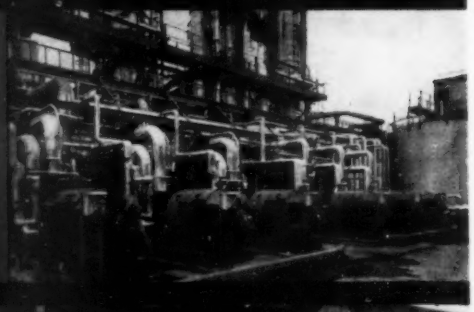
and at CALCUTTA · JOHANNESBURG · SYDNEY · TORONTO

UNICUBE MOTOR CONTROL BOARDS AND PUSHBUTTON STATIONS ARE INSTALLED THROUGHOUT THE WESTFIELD WORKS



Britain's first Lurgi High pressure complete gasification plant installed at Westfield, Fife, is now producing 15 million cubic feet of gas per day and when the second stage is completed almost one fifth of the present Scottish demand will be supplied from Westfield—a tribute indeed to The Scottish Gas Board.

Main Contractors: Messrs. Humphreys & Glasgow Ltd.



M. & C. SWITCHGEAR LTD.

KIRKINTILLOCH, GLASGOW. Phone Kirkintilloch 2288

LONDON 39 Victoria St. S.W.1 Phone ABBEY 6454

SHEFFIELD Olive Grove Road Phone 25178

BIRCLANDS 12 Perrin Avenue, Kidsgrove Phone 2438

NORTH WEST Douglas Lane, Knutsford Phone 2445

NEWCASTLE 1 Eldon Square Phone 25857

CARDIFF 4-5 Mount Stuart Square Phone 28758

...With the compliments of

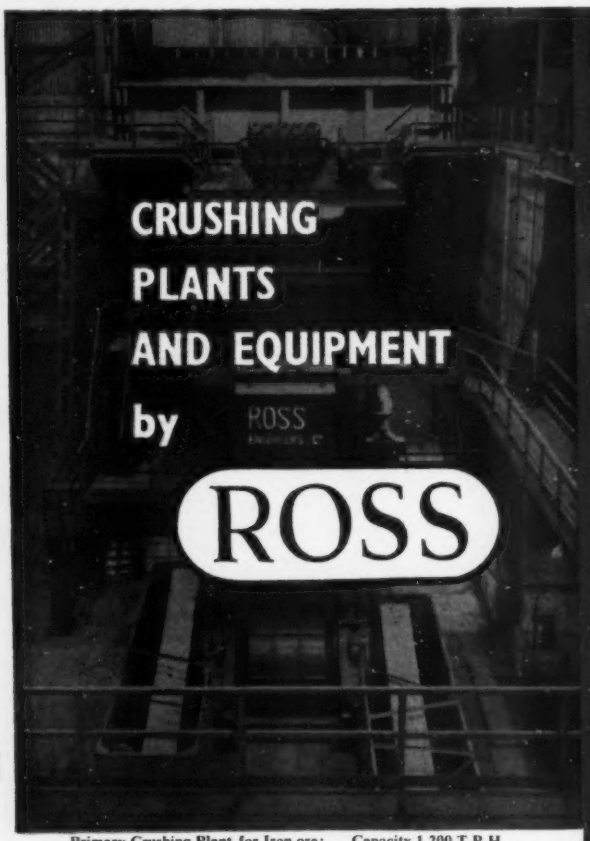
DORMER

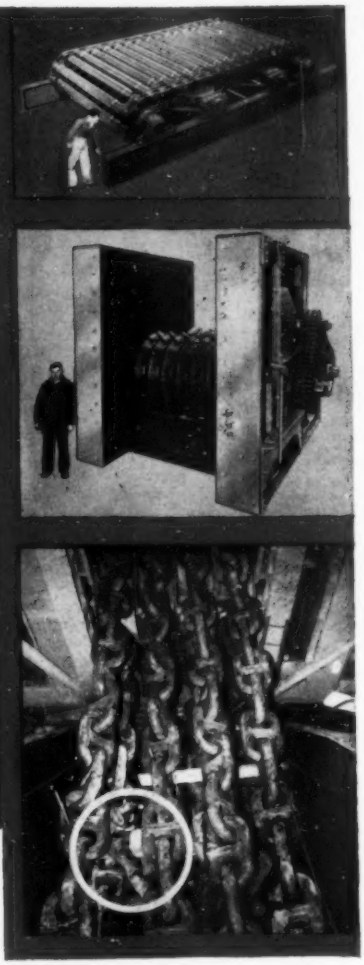
Exceptional performances from an odd drill in a batch are of little value to the regular user of Twist Drills. Multiple drilling, repetitive drilling, production drilling, demand consistency in the working life of each tool, therefore the possibility of obtaining extra holes from every drill is an obvious advantage. The manufacture of DORMER Drills is keyed to this very principle.

MAKERS OF THE FINEST TWIST DRILLS
— BY ANY STANDARD

THE SHEFFIELD TWIST DRILL AND STEEL COMPANY LIMITED
SHEFFIELD **ENGLAND**

DORMER TOOLS ARE OBTAINABLE FROM YOUR USUAL ENGINEERS' MERCHANTS





Primary Crushing Plant for Iron ore: Capacity 1,200 T.P.H.

Over 35 years' experience and know-how in the design, construction and erection of complete CRUSHING AND SCREENING PLANTS, MATERIAL HANDLING EQUIPMENT AND WAGON HANDLING PLANTS for ore, stone, coal, slag, etc. for the Iron and Steel, Cement, Quarrying and Mining Industries.

If your material is dirty or sticky we have an unrivalled experience of the problem and a record of success.

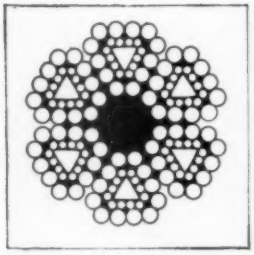
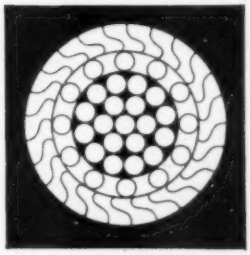
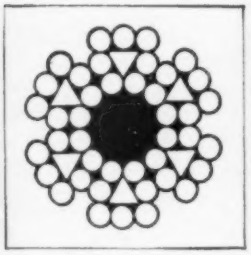
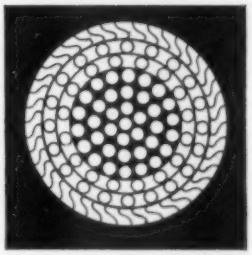
Top—Ross Patent Drop-Bar Feeder
Centre—Ross Patent Two-Roll Grizzly
Bottom—Ross Patent Chain Feeder

ROSS ENGINEERS LTD.,
11 WALPOLE ROAD, SURBITON, SURREY
Telephone: Elmbridge 2345 and 2903
ROSS SCREEN & FEEDER CO., WESTFIELD, NEW JERSEY, U.S.A.
CANADIAN LICENCEES: DORR-OLIVER-LONG LTD, ORILLIA.

PMT1

ROSS

"Glover's Best"

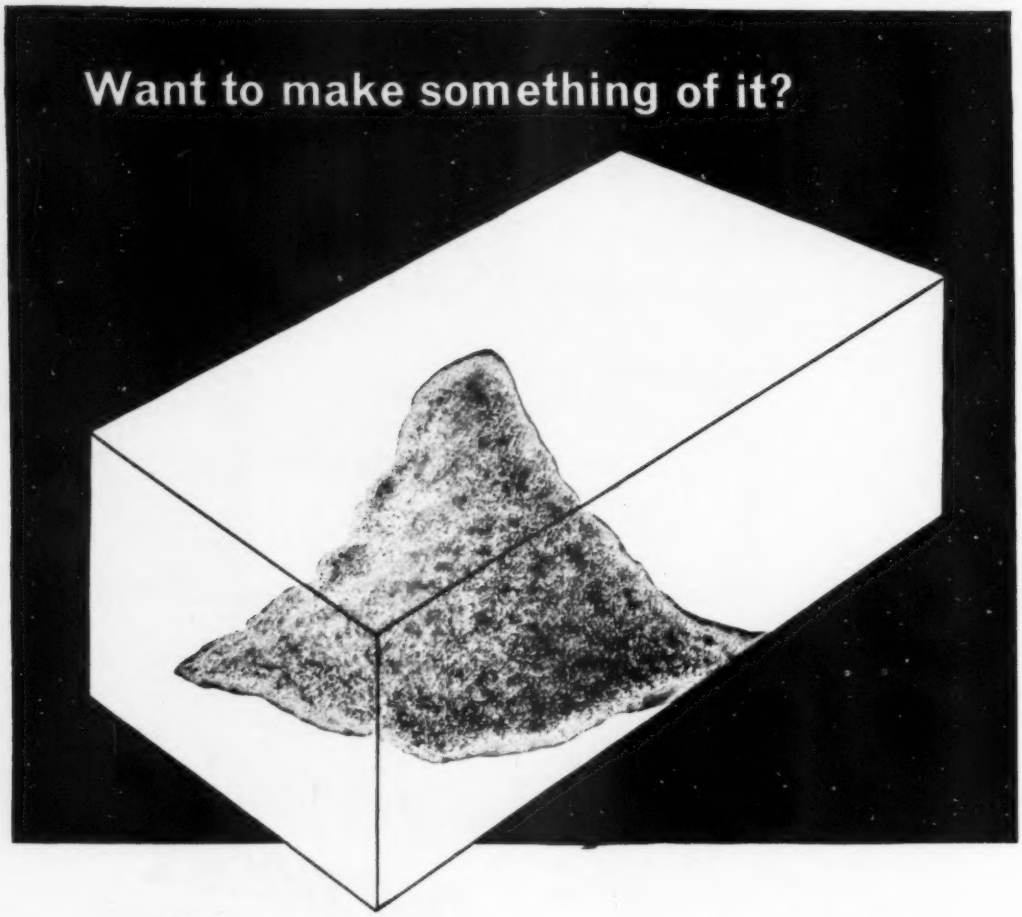





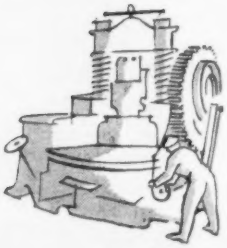
STEEL WIRE ROPES for all purposes

WM. JAS. GLOVER
& CO. LIMITED (EST. 1818)
ST. HELENS, LANCS.
Tel: St. Helens 6159. Grams: "Glovers, St. Helens"

A MEMBER OF THE GLOVER GROUP

Want to make something of it?



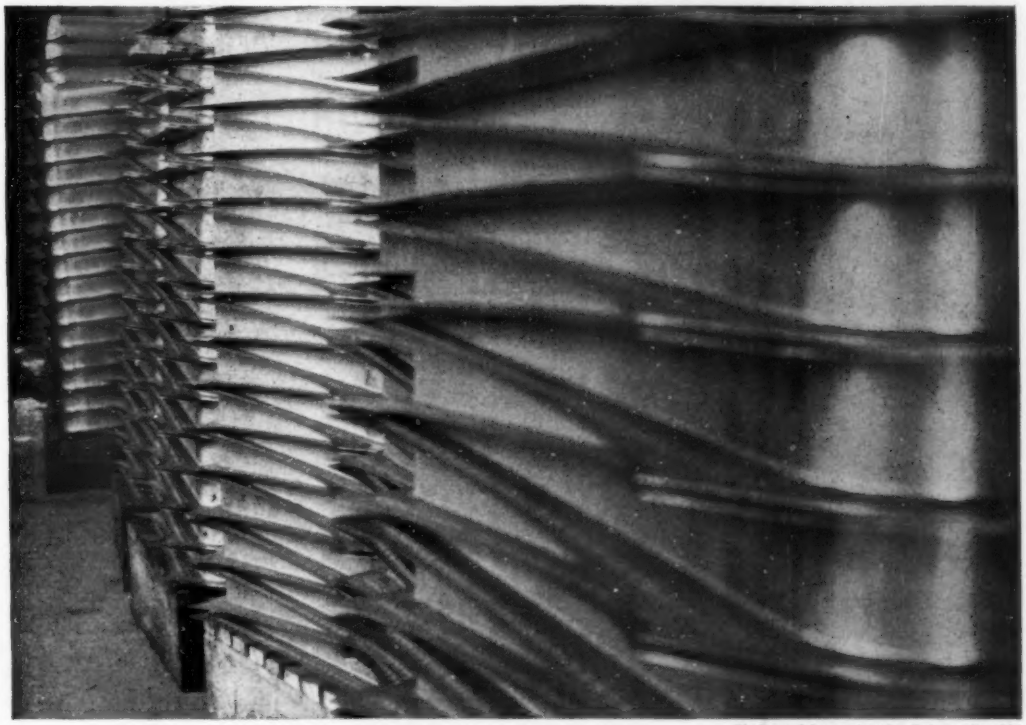


As well as making top quality sand lime, concrete and refractory bricks, the Sutcliffe, Speakman EMPEROR Press makes bricks from clinker, burnt shale, slag, etc. – once considered useless waste. They're good quality bricks, consistent and always well formed.
The EMPEROR Press comes in various sizes – the Duplex exerts a pressure of 200 tons and can make 3,000 bricks an hour, operating round the clock. Sutcliffe, Speakman are specialists in this type of work. They supply a complete range of plant and equipment, and can undertake the erection of complete brickworks and hand them over in working order.
And they are always happy to advise you.

Ask SUTCLIFFE SPEAKMAN about brickmaking

SUTCLIFFE, SPEAKMAN & CO LTD · *LEIGH · LANCASHIRE · TELEPHONE: LEIGH* 72101 (5 *lines*)
London Office: 2 Caxton Street · Westminster SW1 · Telephone: Abbey 3085

IMPROVED RESISTANCE TO CORROSION . . .



Photograph by courtesy Lec Refrigeration Ltd

Another reason why industry is changing over to

DRAGONITE

ELECTRO-ZINC COATED SHEET STEEL

Atmospheric corrosion has always been a problem where the storing of sheet steel is concerned. It's a problem which Dragonite goes a long way to solving.

The steel core of Dragonite is protected by a film of pure zinc which corrodes at a much slower rate than steel. Thus Dragonite can be kept in store far longer than ordinary, uncoated sheet steel without danger of deterioration.

Even after deep drawing or pressing, Dragonite is still well protected against corrosion, because the incredibly thin film of zinc is so ductile that it is not cracked or damaged by fabrication.

There are many more good reasons why you should be using Dragonite. For fuller details, please write for a copy of the *Dragonite Technical Handbook* to:

These are some of the industries in which Dragonite is being used extensively: Domestic Appliances; Electrical Industry; Automobiles; Radio Equipment; Office Furniture.

THE STEEL COMPANY OF WALES LIMITED

Sales Offices: United Kingdom — Abbey Works, Port Talbot, Glamorgan. Overseas — Margam House, 26 St. James's Square, London, S.W.1

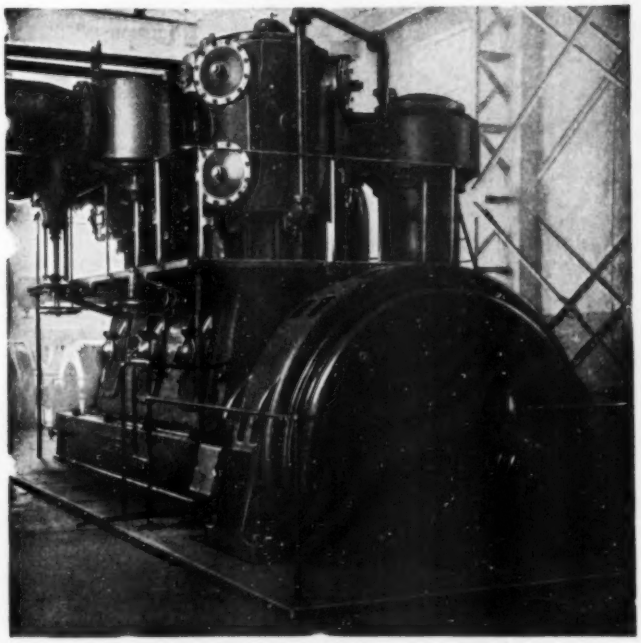
NOT EVEN THE BEST PEOPLE DROP OUR BRICKS— THEY SPECIFY THEM

wherever immaculate shape and size are required,
where high temperatures and heavy loads prevail
and where resistance to spalling is important.
ATLAS bricks give maximum service under these conditions.
Please ask about our new range of Super Mouldables and Castables

UNITED FIRECLAY PRODUCTS LTD
BATHVILLE · ARMADALE · WEST LOTHIAN
REGISTERED OFFICE · 140 West George Street · Glasgow C.2
Telephone ARMADALE 313-316 Telegrams: "Combined" Armadale
A MEMBER OF THE WOODALL-DUCKHAM GROUP OF COMPANIES

Fullerton, Hodgart & Barclay, Ltd.
PAISLEY

ESTD. 1838



Motor-driven, Vertical, Three Crank, Two Stage Air Compressor; Capacity 8,000 cub. ft. free air per minute to 95lb. per sq. in. pressure
One of two recently installed in a South African Mine.

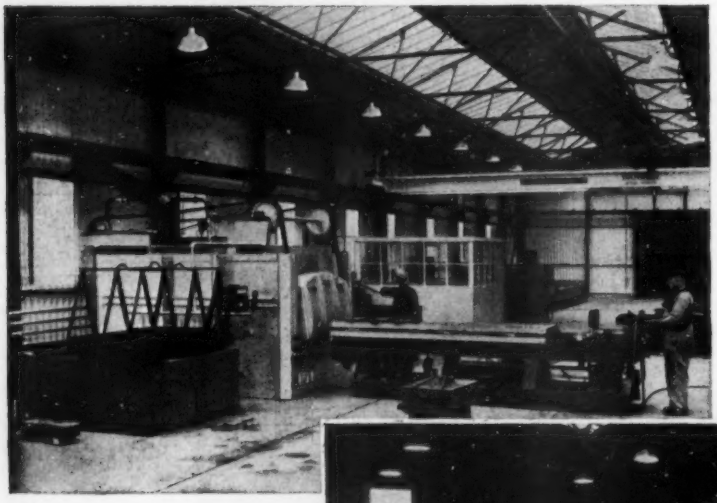
Air and Gas Compressors
all types and sizes

Features:—Low Cost, Simple Design, Accessibility of valves combined with Reliability

★ *ILLUSTRATED CATALOGUE SENT FREE ON REQUEST*

ORMEROD

Capacity available
FOR HEAT TREATMENT AND TESTING



OF CAGE SUSPENSION GEAR, CHAINS, ETC.

General View of Heat Treatment and Testing shop—

General View of Machine shop—

EDWARD ORMEROD & CO. LTD.

MANUFACTURERS OF SAFETY DETACHING HOOKS, SUSPENSION GEAR, ETC.

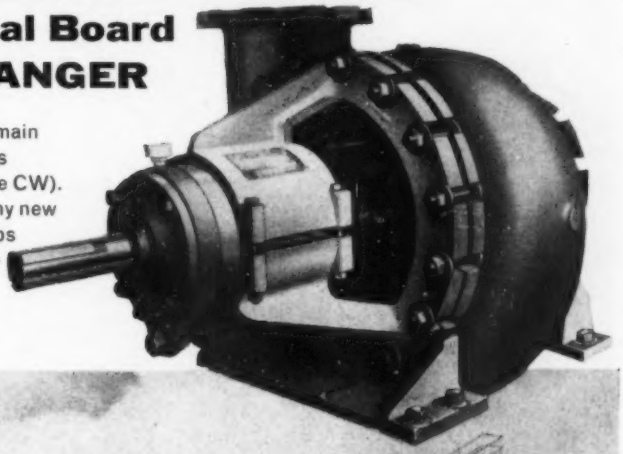
GIBFIELD WORKS · **ATHERTON** · MANCHESTER

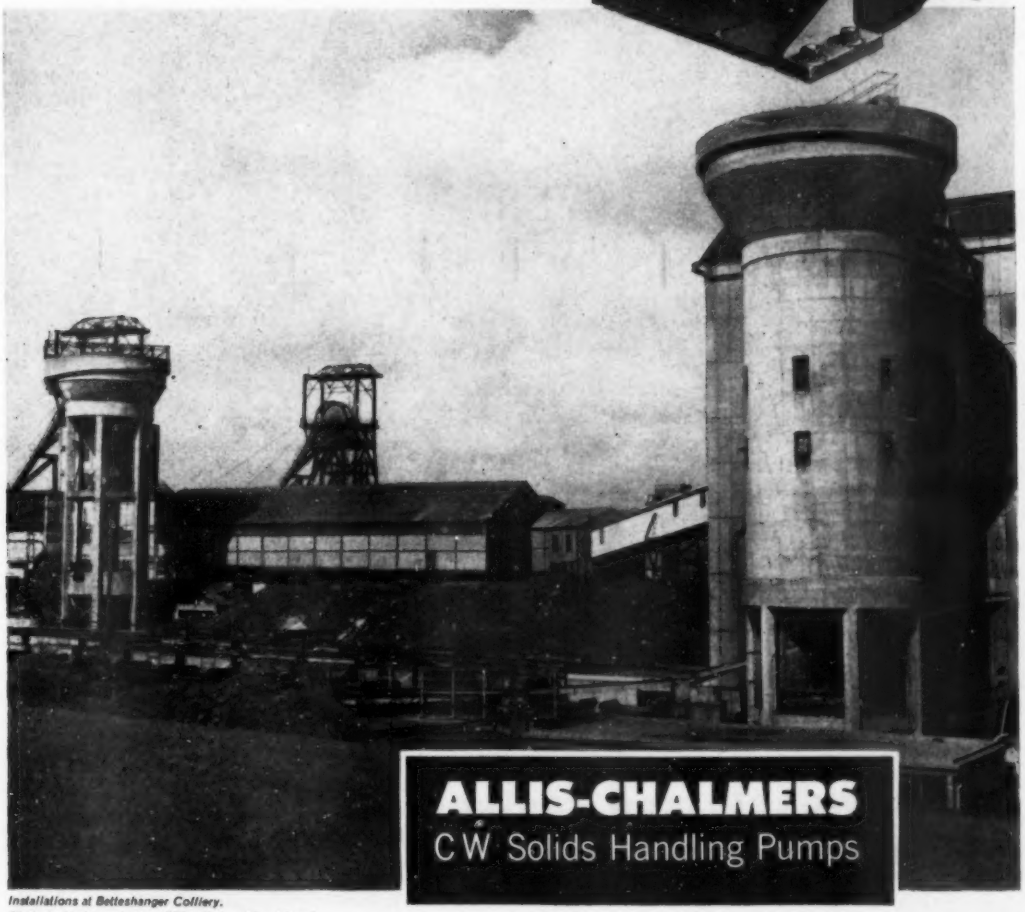
TELEPHONE:- ATHERTON 46 TELEGRAMS:- "ORMERODCO, ATHERTON"

ALLIS-CHALMERS SOLIDS HANDLING PUMPS

for the National Coal Board Plant at BETTESHANGER

Saving time and keeping costs low are the main reasons for the *increasing* use of the famous Allis-Chalmers *Solids Handling Pump* (Type CW). The National Coal Board is only one of many new users of these rugged, utterly reliable pumps which are giving such superb service in the mineral processing industries. *We invite you to write or ring for full information.*

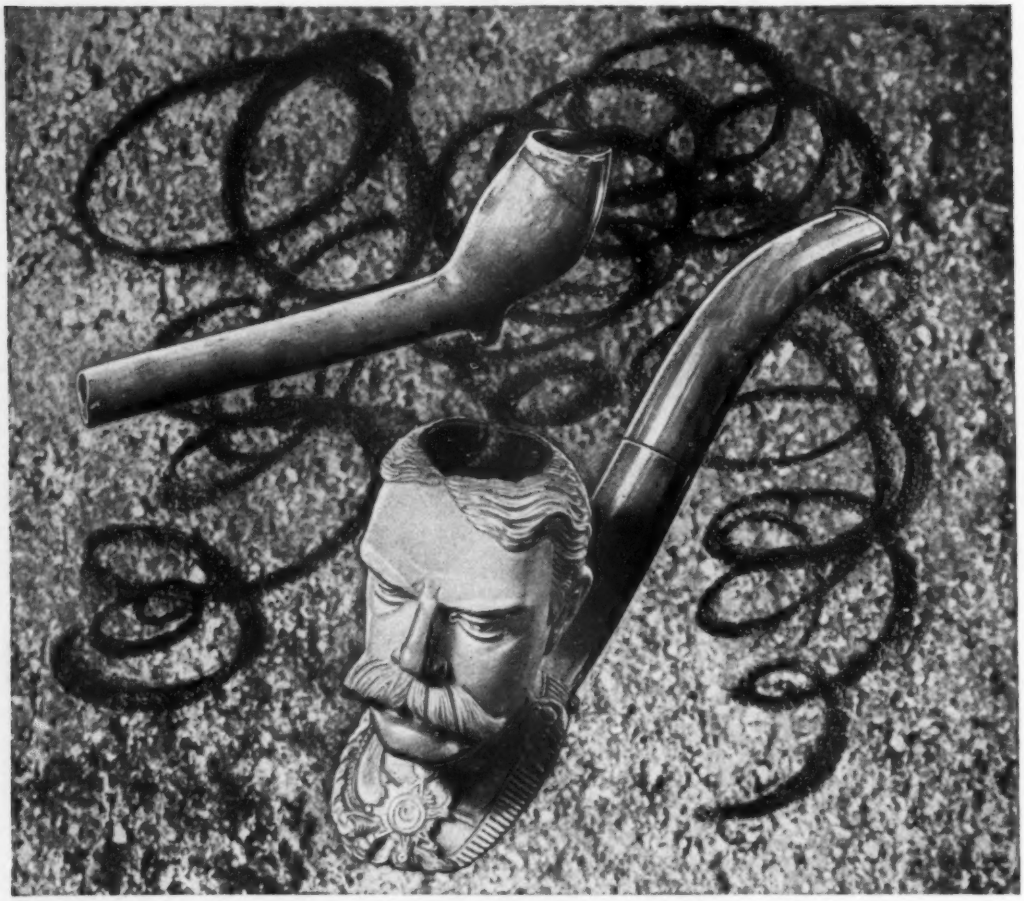




Installations at Betteshanger Colliery.
Photo by kind permission of The National Coal Board.

ALLIS-CHALMERS GREAT BRITAIN LTD., 728 Salisbury House, London Wall, London, E.C.2. Tel: NATional 0821

CPH/61/AC2/4



Furnace size and shape immaterial...

The TRI-MOR range brings freedom to the furnace designer! Fired *in situ*, TRI-MOR gives him the advantages of monolithic construction combined with a performance—in terms of long life and low maintenance—often superior to that obtained from high grade pre-fired bricks and shapes.

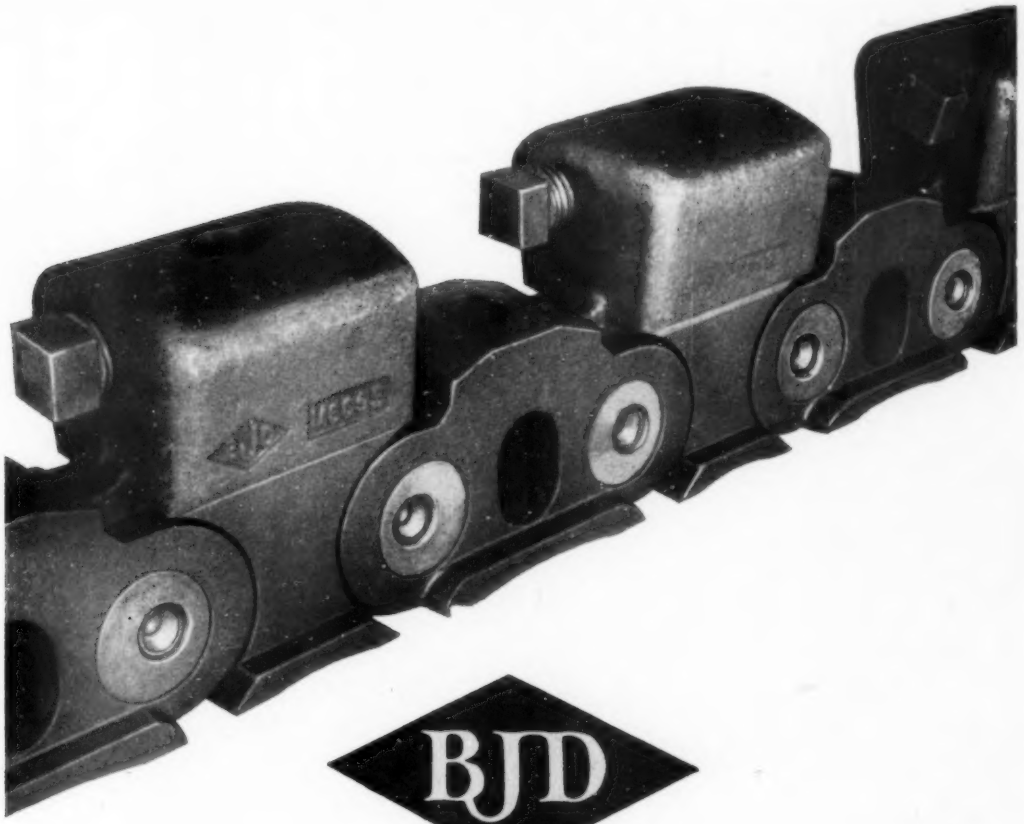
TRI-MOR

mouldable and castable refractories made by...

TRI-MOR HIGH TEMPERATURE MOULDABLE · TRI-MOR STANDARD MOULDABLE · TRI-MOR HIGH STRENGTH CASTABLE · TRI-MOR STANDARD CASTABLE · TRI-MOR 1500 CASTABLE · TRI-MOR HIGH TEMPERATURE CASTABLE · TRI-MOR 1800 CASTABLE · TRI-MOR INSULATING CASTABLE · TRI-MOR DENSE GUNCRETE

MORGAN Refractories Ltd

MORGAN REFRACTORIES LTD., NESTON, WIRRAL, CHESHIRE. Telephone: Neston 1406
A Member of The Morgan Crucible Group
NE.173A/763



BJD

Powerline
cutter chain

Powerline cutter chains are the ideal complement to B.J-D. Coal cutters, they are designed for a long efficient life under the tough conditions encountered on many faces. Powerline chains are made in two forms, guided or unguided, and can be arranged for flight loading.

For a chain that really does its job, decide on Powerline.

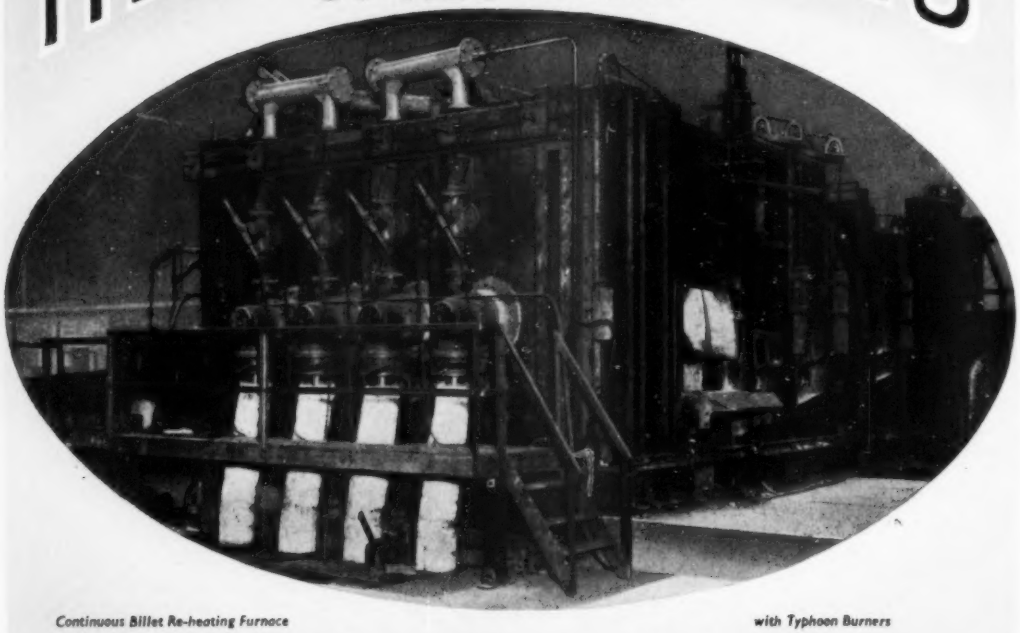
BRITISH JEFFREY-DIAMOND LTD., WAKEFIELD, YORKS. LONDON: 15-17 CAXTON STREET, SW1

WF 5227

2

HEATING FURNACES

OF ALL TYPES



Continuous Billet Re-heating Furnace with Typhoon Burners

ANNEALING FURNACES
REHEATING FURNACES
FORGE FURNACES
WIRE AND STRIP FURNACES

Other Specialities:

PRODUCER GAS MACHINES · SOAKING PITS (ISLEY CONTROLLED) · HOT METAL MIXER CARS · CONTINUOUS ROLLING MILLS · TYPHOON ROTARY FLAME · GAS BURNERS · MILL FURNACES · NASSHEUER CONTINUOUS BRIGHT ANNEALING FURNACES (Sole Licensees)

THE

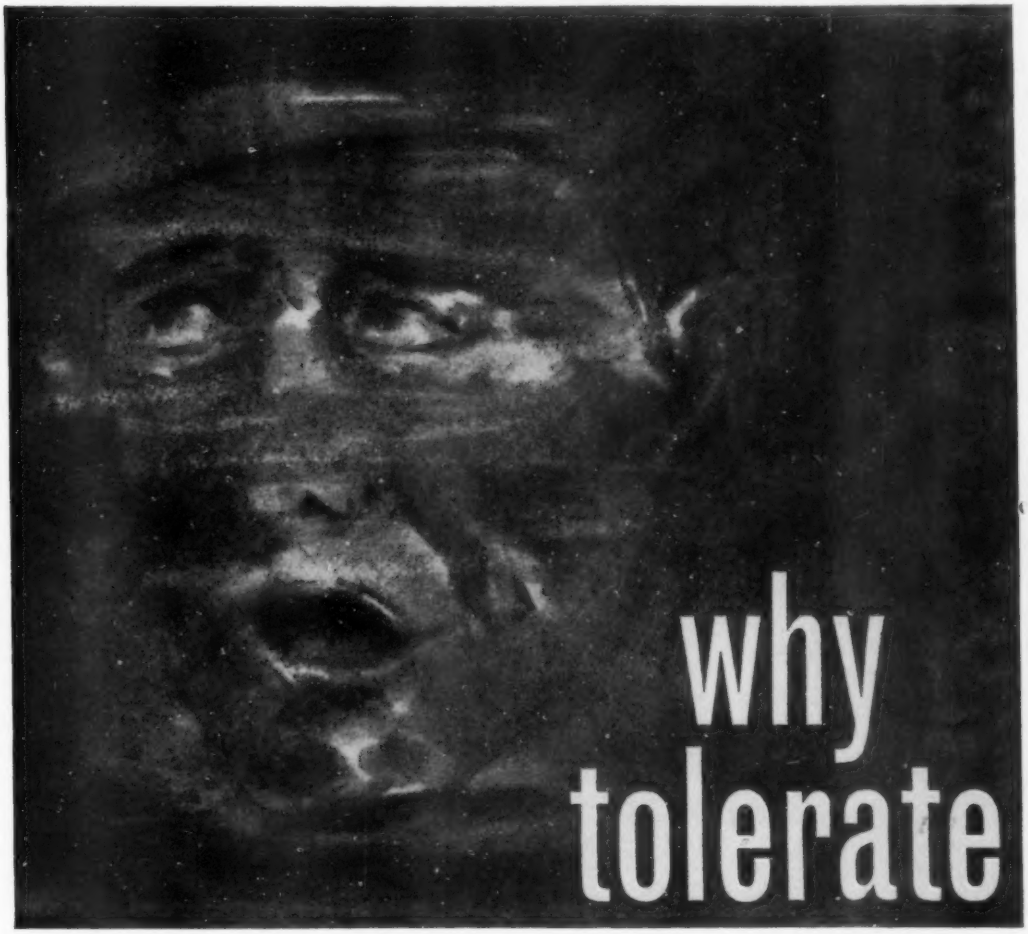
INTERNATIONAL CONSTRUCTION

CO LTD

SUCCESSORS TO JULIAN KENNEDY, SAHLIN & CO LTD

56 KINGSWAY, LONDON WC2

PHONE: HOLBORN 1871 *GRAMS: SAHLIN WESTCENT LONDON*



DUST?

Why indeed! Today the Chem-jet Dust Suppression system means there's no need to put up with outdoor dust hazards. Production bottlenecks caused by dust can be a thing of the past for everybody. If you have a dust problem, write or telephone:—

chem-jet

DUST SUPPRESSION LIMITED

A COMPANY OF THE OLDING GROUP

Oldings Corner, Hatfield, Hertfordshire. *Telephone: Hatfield 2333*

Peak performance...

all the time

with the **MOUNTAINEER** *and* **SHERPA**

All-wheel-drive and powered steering enables the Scammell 4 x 4 Mountaineer to haul its 8/10 cu. yd. load over the very worst of site conditions. The Leyland 0.680 diesel engine and 6-speed gearbox enable it to climb gradients of 1 in 3, shifting 13 tons. Its rugged construction and 'go-anywhere' ability combine to make the Mountaineer an all-weather, round-the-clock proposition.

The 4 x 2 heavy-duty Sherpa Mk. II, new addition to the range of Scammell Dump Trucks can tackle most *arduous conditions* with ease. Economically moves full 9/11 cu. yd. loads. Its 150 h.p. diesel engine, 6-speed constant mesh gearbox, powered steering and a tipping cycle that incorporates full power return, are just some features of this profit-winning vehicle. Fully descriptive leaflet on request.

CRIPPS

for

SCAMMELL

DUMP TRUCKS

SOLE CONCESSIONAIRES IN THE UNITED KINGDOM

R. CRIPPS & COMPANY LIMITED Established 1891

NOTTINGHAM, Tel. 71161. MANCHESTER, Tel. Trafford Park 1658.

SHILDON, (Co. Durham) Tel. 261.

it's safer with . . .

Safety is probably the greatest single factor in the design of products for use in mining

POLAR

Hydraulic Pit Props embody safety with economy.
The heads are quickly and easily changed at the face.
Fully approved by N.C.B. Approval No. H.7

the prop with built-in safety.

Manufactured by

B·R·D

COMPANY LIMITED · ALDRIDGE, STAFFS.

TELEPHONE : ALDRIDGE 53371/9

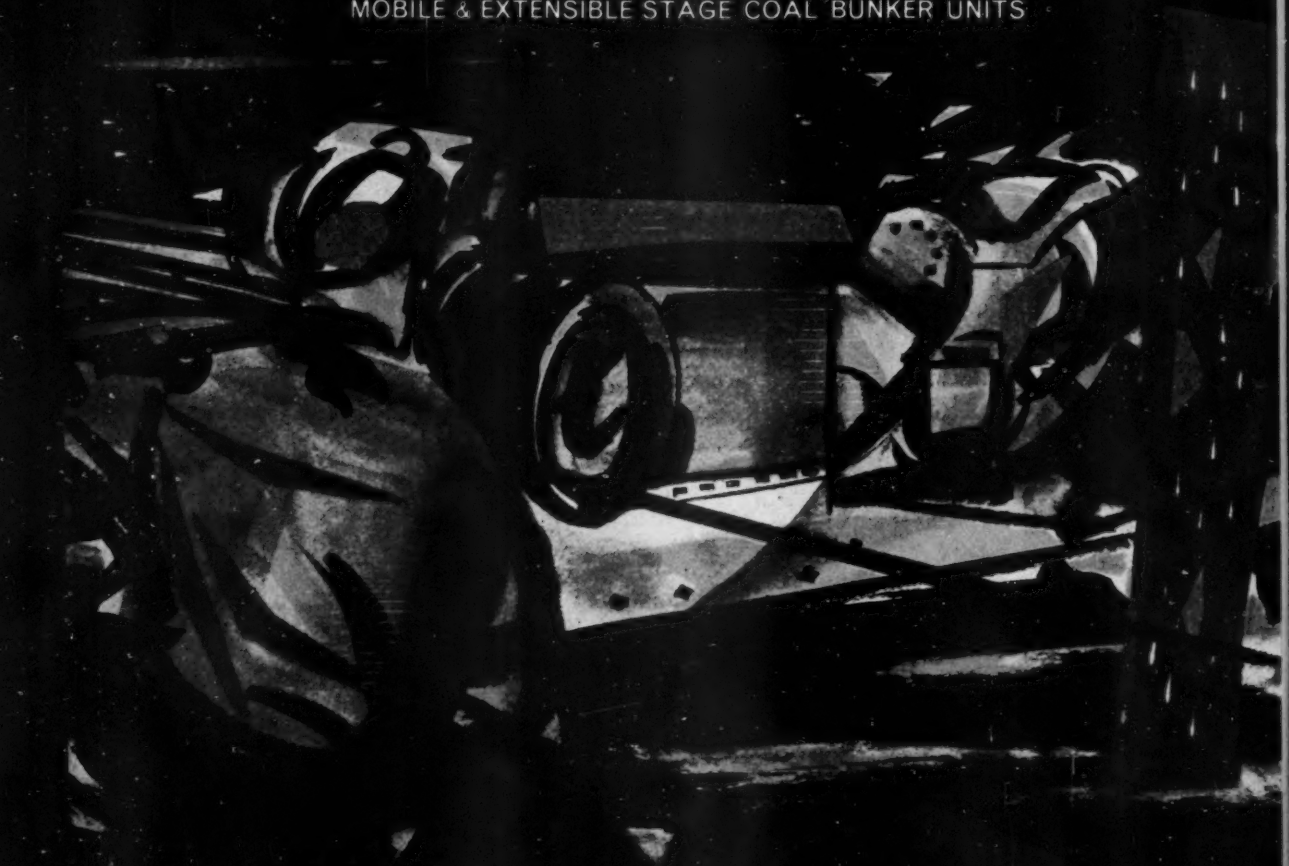
A MEMBER OF THE GKN GROUP OF COMPANIES

CRAWLEY

MINING EQUIPMENT

Crawley thin seam mining equipment includes:—

CRAWLEY-WILCOX CONTINUOUS MINERS · MOBILE BUNKER CONVEYORS
CRAWLEY MIDGET MINERS · MOBILE STAGE LOADERS
LO-HITE ARMOURED SNAKING CONVEYORS · MOBILE STAGE FEEDERS
HEAVY DUTY SNAKING CONVEYORS · EXTENSIBLE STAGE LOADERS
STATIONARY BUNKER CONVEYORS · EXTENSIBLE TUB LOADERS
MOBILE & EXTENSIBLE STAGE COAL BUNKER UNITS



Write for **CRAWLEY** *"Mining Equipment" Catalogue NOW!*

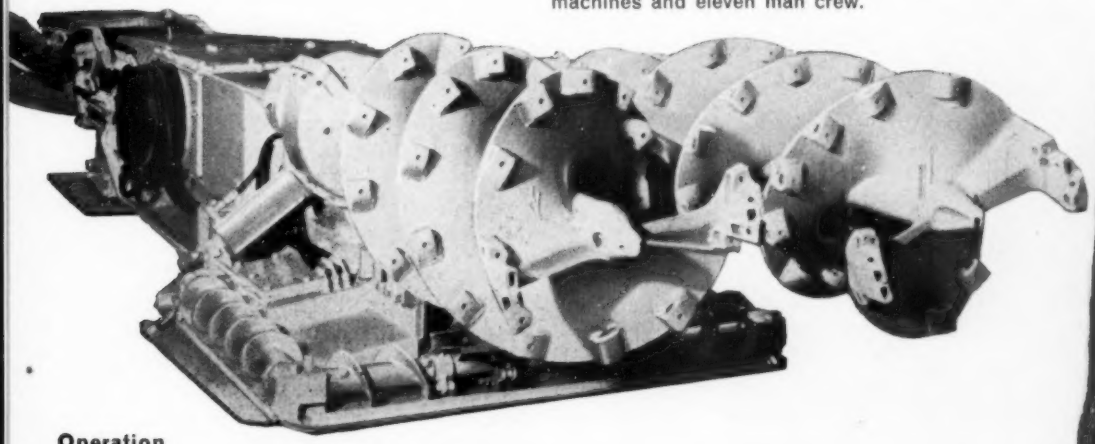
THE CRAWLEY-WILCOX CONTINUOUS MINER

Specification

1. Shortwall cutting machine with two augers, the diameters of which can be varied according to seam thickness.
2. Tungsten carbide cutting picks on front cutting edges and auger scrolls.
3. Flameproofed to British Standards.

Performance

1. Seams 22 in. to 46 in.
2. 300 tons per shift in 36 in. seam with two machines and eleven man crew.



Operation

1. Motor driven augers through reduction gearing rotating in opposite directions—forward oscillation prevents coal binding.
2. Hydraulic controls on machine and conveyor.
3. Coal discharges on to bridge conveyor and thence on to chain conveyor.
4. Bridge conveyor pivots at either end.

Appreciation

1. The lowest Continuous Miner on the market in height, cost and maintenance.
2. Operating in conditions where other equipment has failed.

All Crawley Heavy Duty Machines have the following units standard and interchangeable:

DRIVE FRAME • GEAR BOX • GEAR ASSEMBLIES
EXTENSION SECTIONS • STRUCTURE • TAIL UNIT
CHAIN FLIGHTS

CRAWLEY INDUSTRIAL PRODUCTS LTD · LLANELLY
CARMARTHENSHIRE · S. WALES · Tel: Llanelly 4233

CRAWLEY

AYLING INDUSTRIES GROUP

DOBSON PROPS
DESIGNED TO AVOID STATIC LEAK

The Dobson prop is designed to meet the arduous conditions of modern mining. It is robust in construction, with the minimum of complication in design, giving highly efficient service with low maintenance cost. Its high Yield load resistance of 25 tons gives effective roof support and has the confidence of miners and officials wherever it is used.

Spherical type gland rings are used in the prop which ensure effective load carrying capacity and prevent static leakage of oil whether loaded or otherwise. Each prop undergoes a lengthy test, in the inverted position, before it leaves the works.

For use in wet conditions or where there is any tendency to rusting, hard chrome plated pressure cylinders (as pioneered by Dobsons) are available at a small extra charge. This treatment has given trouble free service in highly corrosive conditions for over 3 years.

DOBSON

Dobson props are available:

For seam heights 19 to 98 inches.

Yield Load ranges–25, 20 and 10 tons.

Brochures forwarded on request to:

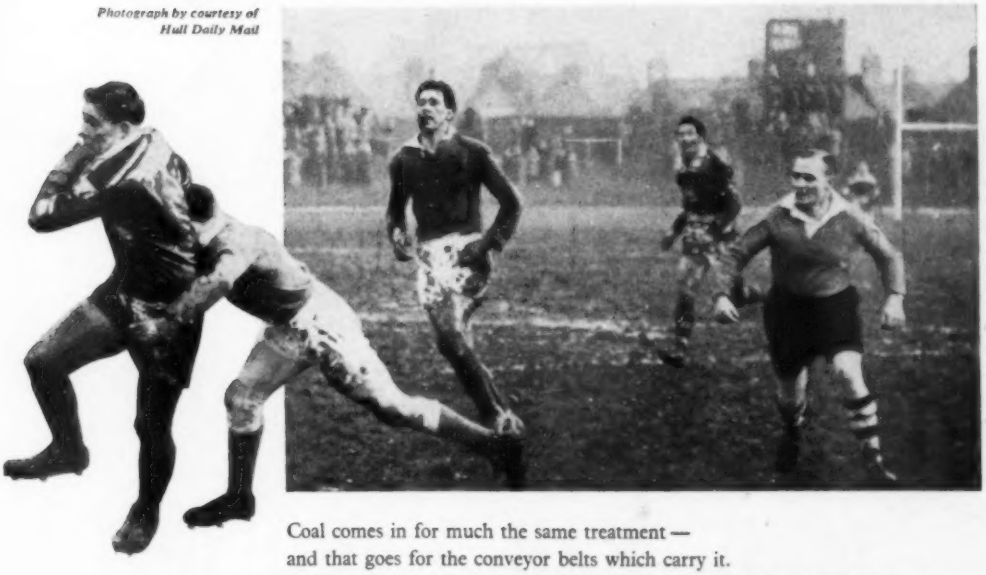
W. E. & F. DOBSON LIMITED,
Chelsea Street, New Basford,
Nottingham.

TELEGRAMS: HYPROP, NOTTINGHAM.
TELEPHONE: NOTTINGHAM 77731.

ROUGH TOUGH HANDLING...

Rough, tough handling — that's the way they treat 'em in Rugby League.
There's no quarter given, and none asked,
but this does not deter stars like Great Britain's John Whiteley
from giving consistent, top-class performance.

Photograph by courtesy of Hull Daily Mail



Coal comes in for much the same treatment —
and that goes for the conveyor belts which carry it.
That's why the new Fenner Diamond range of belting has been developed:
to stand up to the never-ending scrimmages of colliery life:
to maintain vital handling movements and to score
production points even under the wettest conditions.

Fenaplast

HEVAC

WE ARE EXHIBITING

DIAMOND TYPE COLLIERY CONVEYOR BELTING

A PRODUCT OF

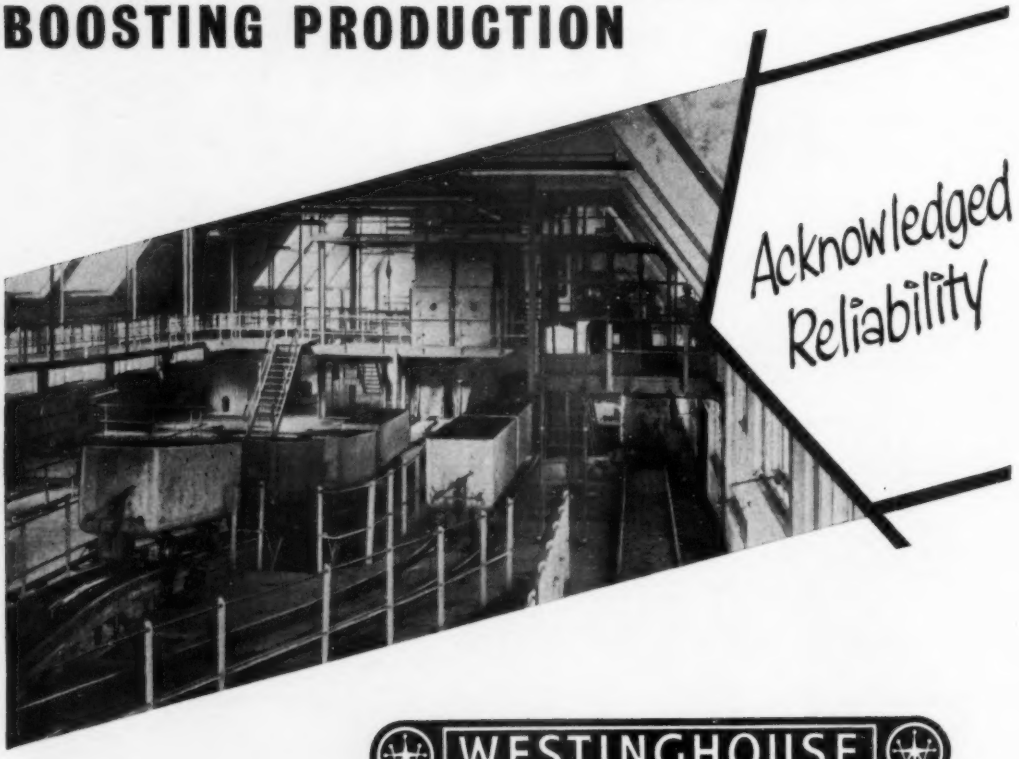
J. H. FENNER & CO. LTD. HULL

LARGEST MAKERS OF V-BELT DRIVES IN THE COMMONWEALTH

FACTORIES OVERSEAS IN AUSTRALIA, INDIA AND SOUTH AFRICA

3

INCREASING EFFICIENCY... BOOSTING PRODUCTION



WESTINGHOUSE

MINE CAR HANDLING EQUIPMENT

Over 40 years' experience in colliery engineering design and manufacture.

WESTINGHOUSE BRAKE AND SIGNAL CO., LTD., 82 York Way, King's Cross, London, N.1
Tel: TERminus 6432

Blair Twin Rope Winder. braked by BLACKS High Pressure Hydraulic Oil Winder control and Brake Gear -

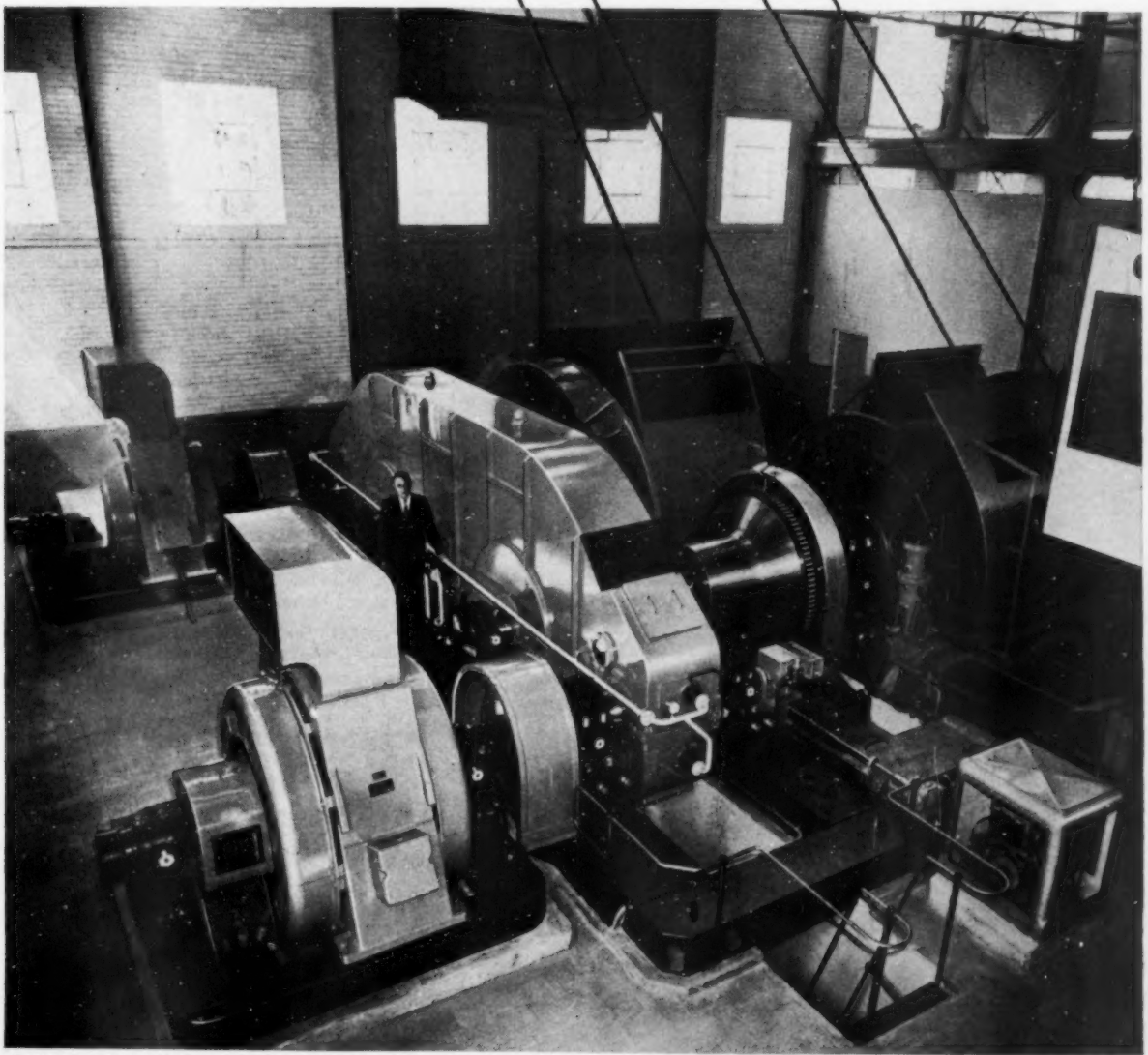
THE BLAIR HOIST AT THE PRESIDENT BRAND GOLD MINE

This twin rope winder pioneered by R. Blair Esq., Consulting Mechanical Engineer to the Anglo American Corporation is equipped with High Pressure Hydraulic Control Gear and Brakes pioneered by Blacks Mining Equipment Ltd.

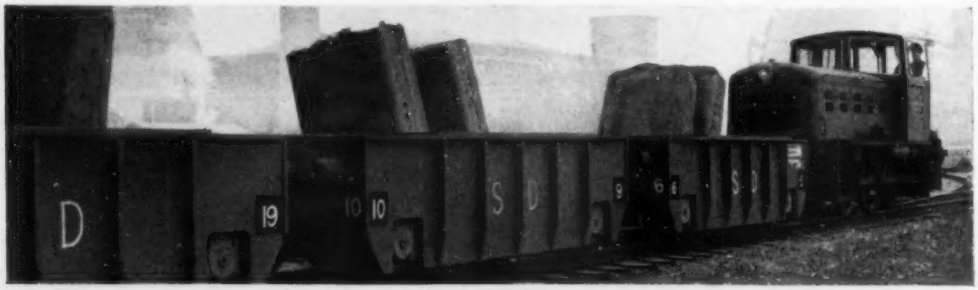
Complete electrical equipment designed and manufactured by THE BRITISH GENERAL ELECTRIC CO. (PTY) LTD.

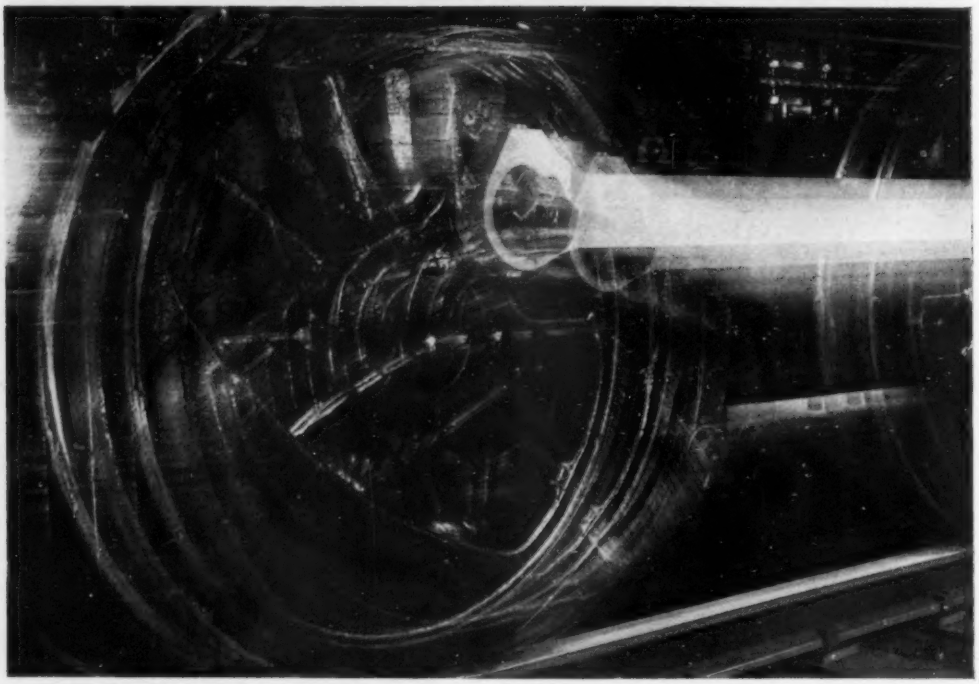
Brake Gear, High Pressure Hydraulic Control Gear and Safety Controllers designd and supplied by BLACKS MINING EQUIPMENT LTD.

Mechanical parts designed and Manufactured by VANDERLEIJL ENGINEERING CORPORATION LTD.



BLACKS MINING EQUIPMENT LTD. 44 MASONS HILL, BROMLEY, KENT. RAVENSBOURNE 4653



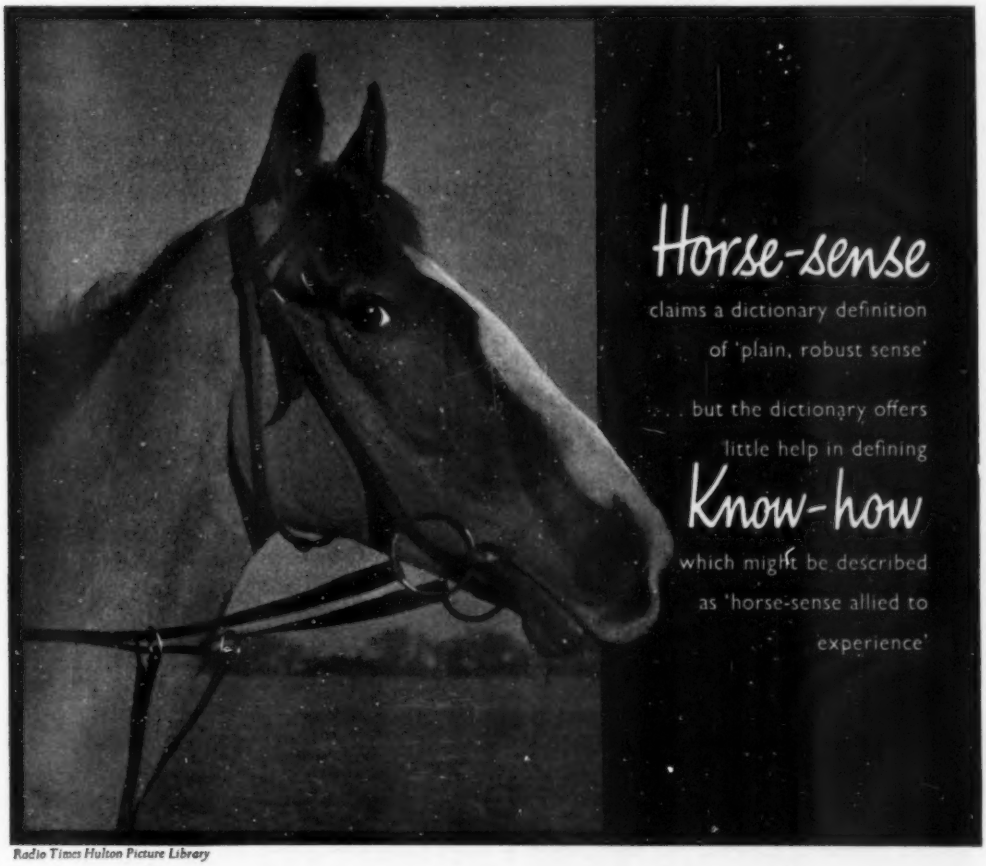


Hot steel is not to be trifled with. That's why Fowler diesel locomotives have been chosen again by the South Durham Steel and Iron Co. to serve their vast new plant at Greatham near West Hartlepool. Strictly-timed steel-making processes with associated handling problems similarly closely-controlled demand locomotives with immediate availability, high tractive effort and modest maintenance needs. These requirements, and more, are met by the Fowler diesels at Greatham working 24 hours a day.

FOWLER

means faster handling

JOHN FOWLER & CO (LEEDS) LTD, LEEDS 10. TEL: 30731



Radio Times Hulton Picture Library

IN MORE THAN FIFTY YEARS

as manufacturers of **electric motor control gear,** Allen West & Co Ltd have developed a specialist 'know-how', backed by intensive programmes of testing and research.

For all industrial, traction, and marine applications, the acknowledged symbol of service and reliability is

ALLEN WEST

ALLEN WEST & CO LTD BRIGHTON ENGLAND · Telephone: Brighton 66666 · Telegrams: Control, Brighton

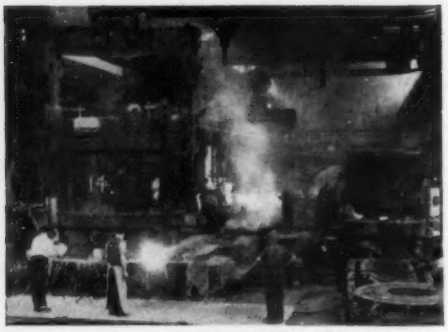
Engineers and Manufacturers of Electric Motor Control Gear and Switchgear

SUBSIDIARY COMPANIES IN CANADA, SOUTH AFRICA AND RHODESIA · AGENCIES THROUGHOUT THE WORLD

An 1859 achievement

ESC

Casting a 75in. diameter Bell for San Francisco in 1859.



Pouring 142 ton Steel Casting using three ladles simultaneously in 1959.

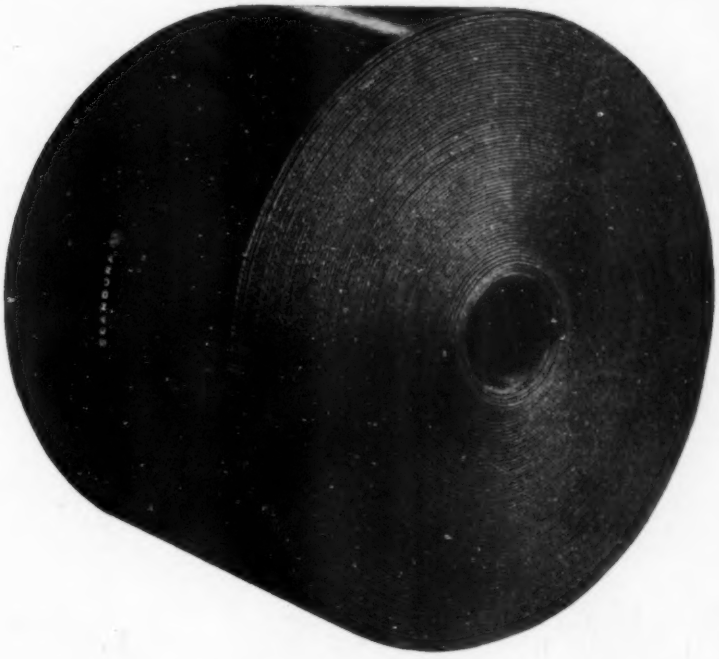
and still leading in 1961

With a background of over 100 years in steel foundry practice, English Steel Castings Corporation Ltd., produces a wider variety of steel castings than any other steel foundry in the world (from a few pounds to 185 tons individual weight) and operates the most comprehensive plant in Europe.

ENGLISH STEEL CASTINGS CORPORATION LTD

River Don Works, Sheffield

A WHOLLY-OWNED SUBSIDIARY OF ENGLISH STEEL CORPORATION LTD



SCANDURA

the accepted name in
mine conveyor belting

On the first length of plastic covered belting ever to be installed in a coal mine, you could read the name 'Scandura'. That was in 1948 and ever since then more and more mines have been replacing their belts with Scandura. These years of manufacturing experience have helped to make Scandura Gold Line the finest belting of its kind available anywhere.

MANUFACTURED BY THE BELTING DIVISION OF BBA

BRITISH BELTING & ASBESTOS LTD · CLECKHEATON · YORKSHIRE

TWO FIRST CLASS MACHINES FOR THE PRICE OF ONE

Yes, TAYLOR JUMBO versatility ensures consistent, cost-cutting efficiency all around the yard. Equipped with deep-digging hydraulic grab, TAYLOR JUMBO cranes handle all classes of coal with minimum spillage, negligible breakage—speed your transport turnround.

CONVERSION FROM GRABBING MACHINE TO LIFTING CRANE WITH HOOK ACCOMPLISHED IN MINUTES.

TAYLOR MOBILE CRANES

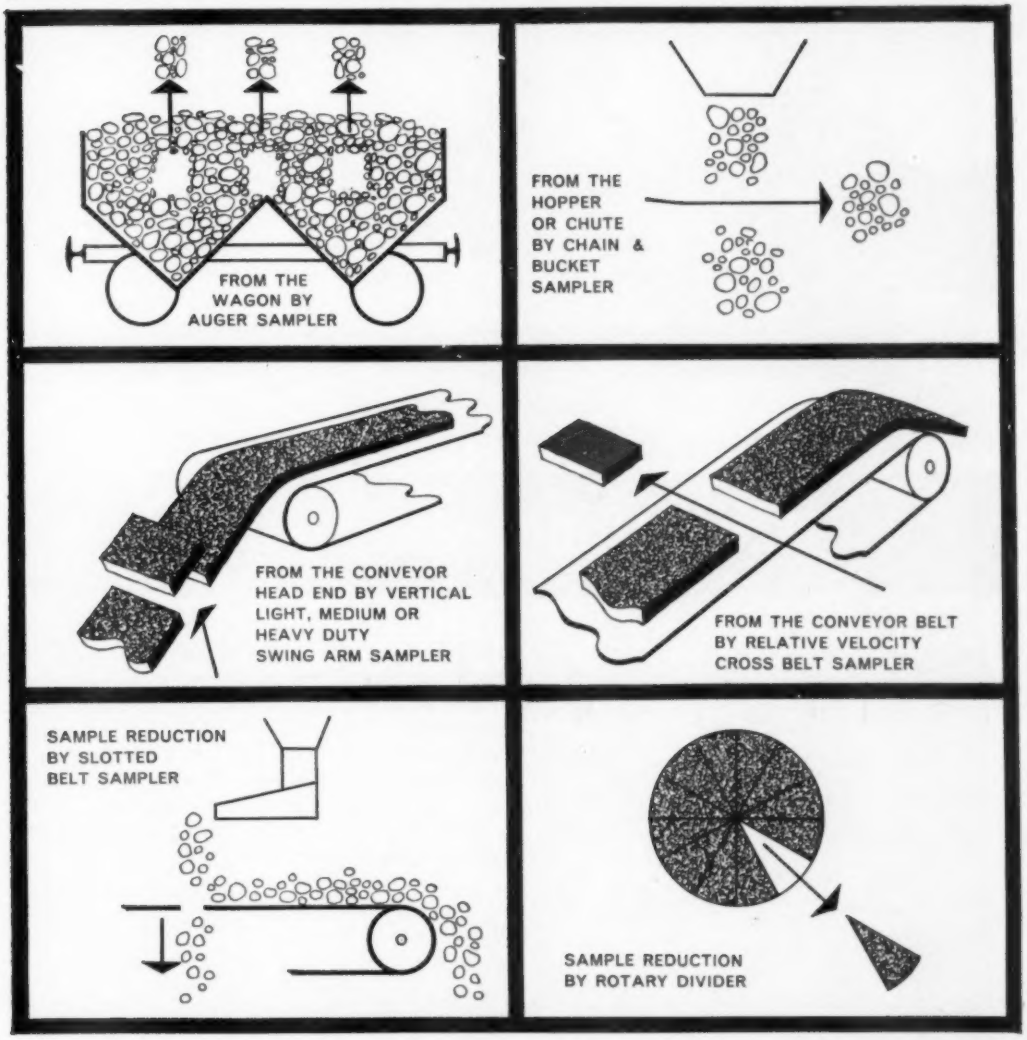
F. TAYLOR & SONS (MANCHESTER) LTD.

STEEL HOUSE, EASTCOTE, MIDDLESEX.
SALES AND SERVICE: LONDON, BRISTOL, BIRMINGHAM, MANCHESTER, LEEDS, NEWCASTLE, GLASGOW.

THE ASSOCIATION OF CRANE MAKERS A C M

A MEMBER OF THE STEEL GROUP OF CRANE AND EXCAVATOR MANUFACTURERS.

973


FROM THE WAGON BY AUGER SAMPLER
FROM THE HOPPER OR CHUTE BY CHAIN & BUCKET SAMPLER
FROM THE CONVEYOR HEAD END BY VERTICAL LIGHT, MEDIUM OR HEAVY DUTY SWING ARM SAMPLER
FROM THE CONVEYOR BELT BY RELATIVE VELOCITY CROSS BELT SAMPLER
SAMPLE REDUCTION BY SLOTTED BELT SAMPLER
SAMPLE REDUCTION BY ROTARY DIVIDER

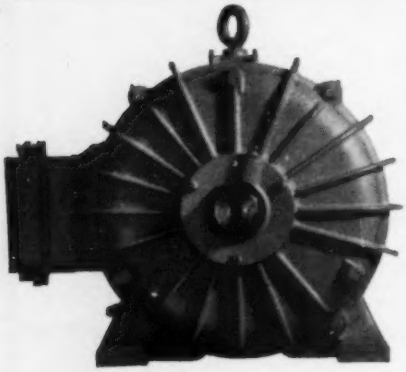
a complete range of sampling equipment

Registered Office and Materials Handling Dept.
BIRTLEY · CO. DURHAM
PHONE BIRTLEY 248/9 · CABLES: BIRTLEY · NEWCASTLE UPON TYNE

Coal Preparation Dept.
MARKET PLACE CHAMBERS · WEST BARS · CHESTERFIELD · ENGLAND
TEL: CHESTERFIELD 4116 (2 lines) CABLES: BIRTLEY, CHESTERFIELD

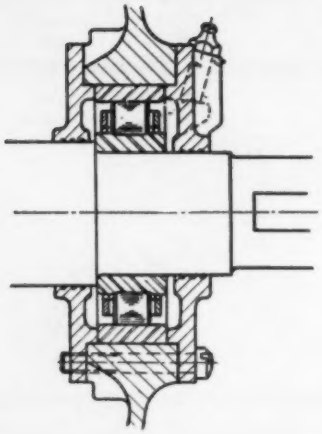
London Office
B·S·A HOUSE · 54 ST. JAMES STREET · LONDON S·W·1
PHONE HYDE PARK 8551

BIRTLEY ENGINEERING LTD



Engineers use the word performance in two senses, a limited one which refers to parameters that can be specified and checked; and a wider, vaguer, but essentially more realistic sense which covers freedom from trouble, ease of servicing, adaptability and many other things. Performance in the first sense is reproducible by any competent manufacturer; it depends on designing to well established principles. Performance in the second sense is the basis of choice between manufacturers. It comes from countless small differences in design that are based on know-how or experience.

This thing called know-how



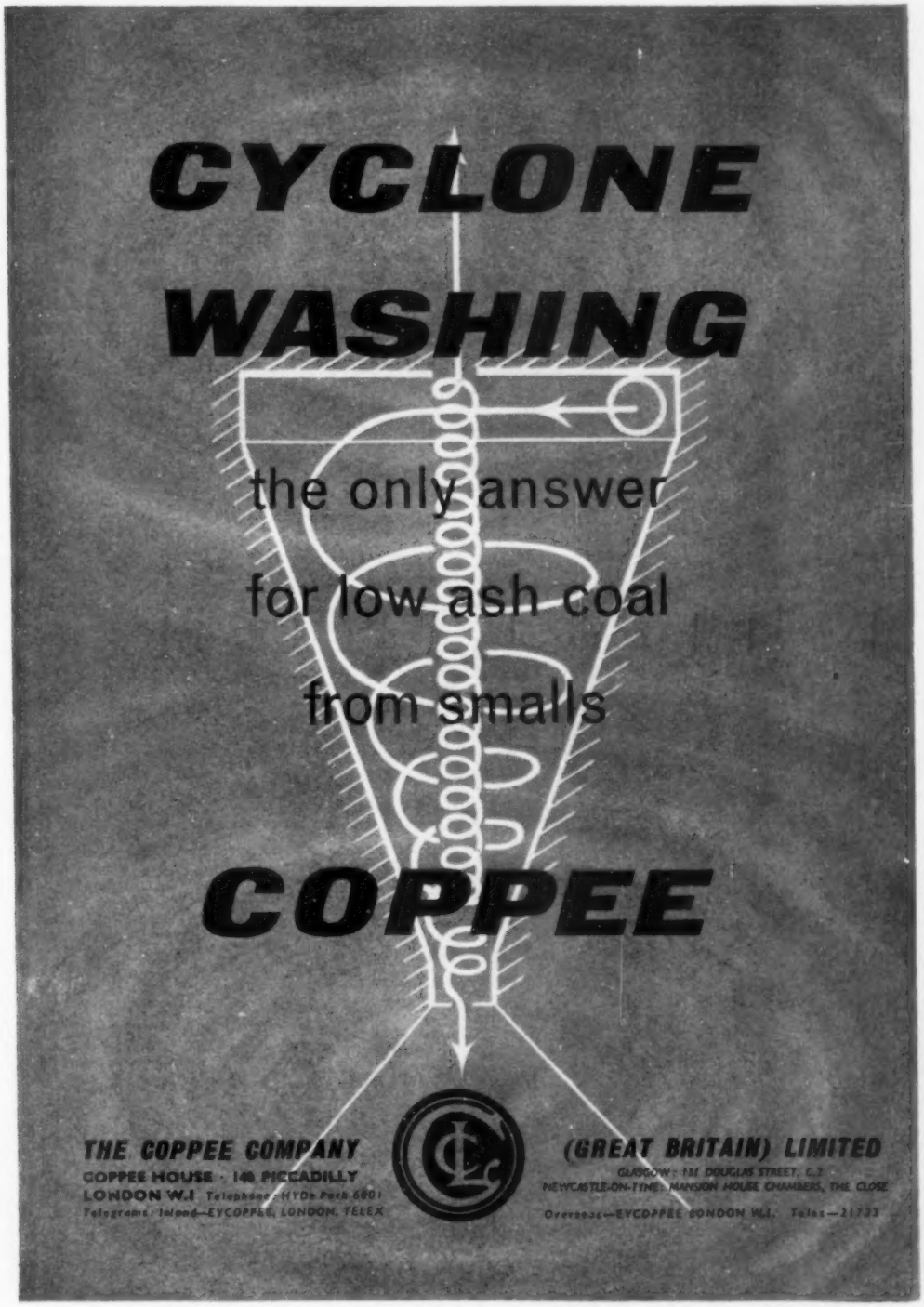
Take for example bearings. We were amongst the first manufacturers to fit ball and roller bearings to electric motors and, in fact, they were standard equipment on our machines whilst the majority of motors still had sleeve bearings. The ubiquity of ball and roller bearings on motors today indicates how right this early choice was. There is a small but important detail in which the housings of the bearings on our motors differ from those on many others. We bore the end-shield clean through and fit two caps. The through bore allows of more accurate gauging—particularly with regard to parallelism—than a blind hole and the cost of the extra cap is in our opinion more than justified by this and by the better grease retention it makes possible.

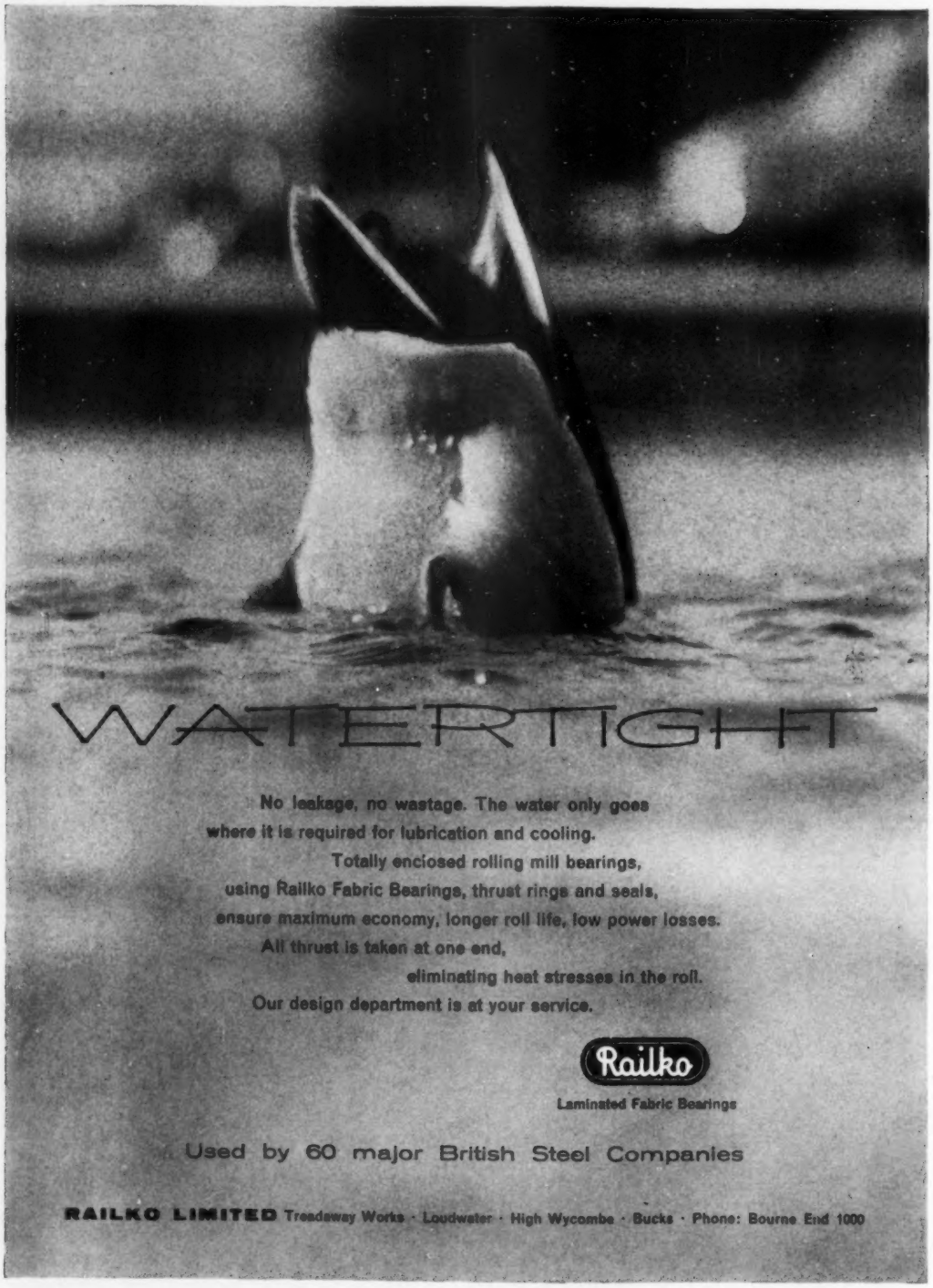
Crompton Parkinson LIMITED

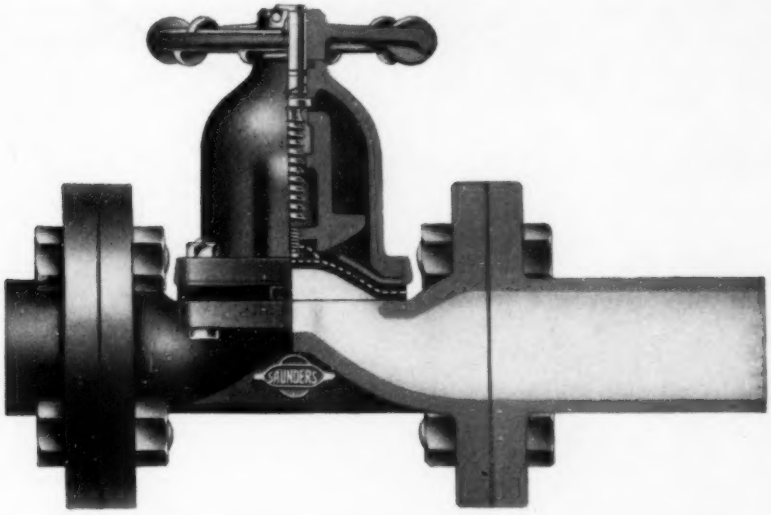
Makers of Electric Motors of all kinds, A.C. and D.C. Generators, B.E.T. Transformers, Switchgear, Cables, Instruments, Lamps, Lighting Equipment, Batteries, Stud Welding Equipment, Traction Equipment, Ceiling Fans.

CROMPTON PARKINSON LTD · CROMPTON HOUSE · ALDWYCH · LONDON · WC2

G612


CYCLONE
WASHING
the only answer
for low ash coal
from smalls
COPPEE
THE COPPEE COMPANY
COPPEE HOUSE · 140 PICCADILLY
LONDON W.1 Telephone: HYDe Park 6801
Telegrams: Inland—EYCOPPEE, LONDON, TELEX
(GREAT BRITAIN) LIMITED
GLASGOW: 121 DOUGLAS STREET, C.2
NEWCASTLE-ON-TYNE: MANSION HOUSE CHAMBERS, THE CLOSE
Overseas—EYCOPPEE LONDON W.1. Telex—21733


WATERTIGHT
No leakage, no wastage. The water only goes
where it is required for lubrication and cooling.
Totally enclosed rolling mill bearings,
using Railko Fabric Bearings, thrust rings and seals,
ensure maximum economy, longer roll life, low power losses.
All thrust is taken at one end,
eliminating heat stresses in the roll.
Our design department is at your service.
Railko
Laminated Fabric Bearings
Used by 60 major British Steel Companies
RAILKO LIMITED Treadaway Works · Loudwater · High Wycombe · Bucks · Phone: Bourne End 1000



DIFFERENT - - to handle Vacuum as safely as Pressure

For Vacuum duties many factors have to be considered. There are Saunders Valves for use on most vacuum services and the Saunders Valve Research Panel is at the disposal of any enquirer with problems in this field.

SAUNDERS DIAPHRAGM VALVES

with reinforced diaphragms are eminently suitable for the increasing number of vacuum processes encountered in industry

SAUNDERS VALVE COMPANY LIMITED
DIAPHRAGM VALVE DIVISION
CWMBRAN MONMOUTHSHIRE Telephone Cwmbran 3081

How long is a piece of wire rope?

Perhaps as long as the experience built into GLOVER STEEL WIRE ROPES—going back over 120 years. Glover Steel Wire Ropes are designed for longest operational life; highest functional efficiency; negligible maintenance; job-proof toughness, and are now in use in every industry throughout the world. The only British manufacturers of Steel Wire Ropes who work in direct association with a group of mechanical handling engineers—The Glover Group design and supply:—

Steel Wire Ropes, Chair Lifts, Aerial Ropeways, Conveyors, Cableways, Drag Scrapers, etc. and all Mechanical Handling Equipment.

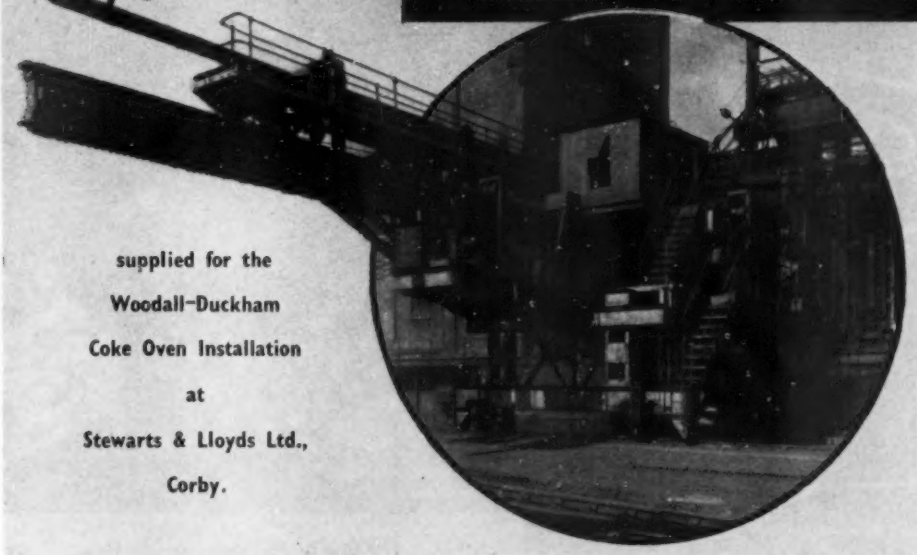
Write for further details to

GLOVER BROTHERS (MOSSLEY) LTD

Mossley, Nr. Manchester. Grams: "Ropes", Mossley.
For IMMEDIATE attention 'phone MOSSLEY 444

MEMBERS OF THE GLOVER GROUP:
British Ropeway Engineering Co. Ltd., Drag Scraper & Conveyor Co. Ltd., Glover Brothers (Mossley) Ltd., Wm. Jas. Glover & Co. Ltd., Ropeways Ltd.

Outstanding Performance of Wellman Machines



supplied for the
Woodall-Duckham
Coke Oven Installation
at
Stewarts & Lloyds Ltd.,
Corby.

3 Combined Coke Pushing, Coal Levelling and Door Extracting Machines

3 Coke Side Door Extracting Machines with Coke Guides

3 Coal Charging Cars

These machines, which operate with a high degree of efficiency and minimum maintenance, have already dealt with 22 million tons of coal and have charged and pushed more than 1,500,000 ovens.

THE WELLMAN SMITH OWEN ENGINEERING CORPORATION LTD

PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1 WORKS: DARLASTON, South Staffs, & BELFAST.

re-covering DRUM FILTERS?

Fit in one operation the latest **"United"** wirecloth panels joined to give any required width with the heavy duty ***FREE-FLOW*** butt seam which **Retains The Aperture Characteristics Of The Cloth**

* Cloths tailor made to fit any drum in one width
* No overlaps to interrupt screening area and cause uneven caking
* The "Free-Flow" seam gives a single width square-woven cloth with high screening area, providing rapid de-watering of cake
* Extensive use over the last two years has proved the strength and durability of the seam

Write and ask for a sample

Special re-covering service for sectors on all types of disc filters
Large and comprehensive stocks held in Edinburgh, Newcastle and London

THE UNITED WIRE WORKS LTD

HEAD OFFICE and WORKS: EDINBURGH 5.
Branch Works: Brinkburn Street, Newcastle upon Tyne 6.

Telephone: GRAnton 6241 LONDON MONarch 7249/7240 NEWCASTLE 659191
P6089

machines to make men giants . . . .

Given the tools to bring out the coal, today's miner has the output of a giant. His labour is multiplied a hundredfold by such machines as the Joy Continuous Miner,* a continuous cutting and loading machine which is hitting new heights with production figures in British coalfields.
The harnessing of such great power, and its application to mine mechanisation schemes, is the task of Joy engineers who are working closely with mine managements to win more and cheaper coal.

* *The Joy Continuous Miner is adaptable for a variety of seam heights. It cuts loads and feeds at approximately 3-4 tons per minute. To explore the possibilities of using this and other Joy machinery in your own workings, consult a Joy mining engineer.*

JOY · SULLIVAN LTD

CAPPIELOW, GREENOCK, SCOTLAND.

SPARES DIVISION: CALLYWHITE LANE, DRONFIELD, Nr. SHEFFIELD.

4

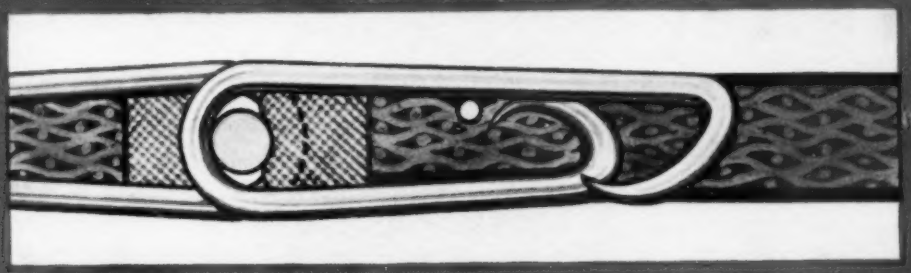
BLOOMS BILLETS SLABS
COLLIERY ARCHES AND PROPS
ROOFING BARS
HAMMERLOCK STRUTS
LIGHT RAILS AND SLEEPERS
BASIC AND HEMATITE PIG IRON
FERROUS AND NON-FERROUS CASTINGS

FOR STEEL

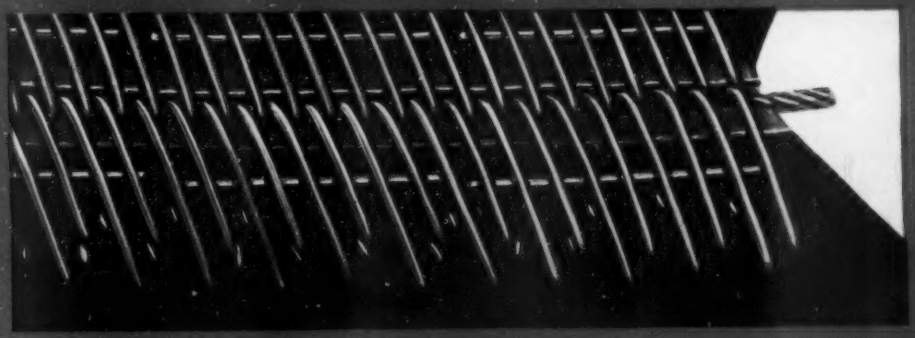
GUEST KEEN
IRON & STEEL WORKS
(Branch of G.K.N. Steel Company Limited)
EAST MOORS CARDIFF
Telephone: Cardiff 33151

A MEMBER OF THE GKN GROUP OF COMPANIES

ONLY COMET FASTENERS



with the Wedge action Clench



give Increased joint strength

The profile of Comet's ground point, its smoothness and final plating ensure clean penetration with least disturbance of belt fabric....angle of entry and Comet's special wedge-action clench add greater strength to the joint.

On test, on the face, a Comet joint is stronger....longer.

Comet

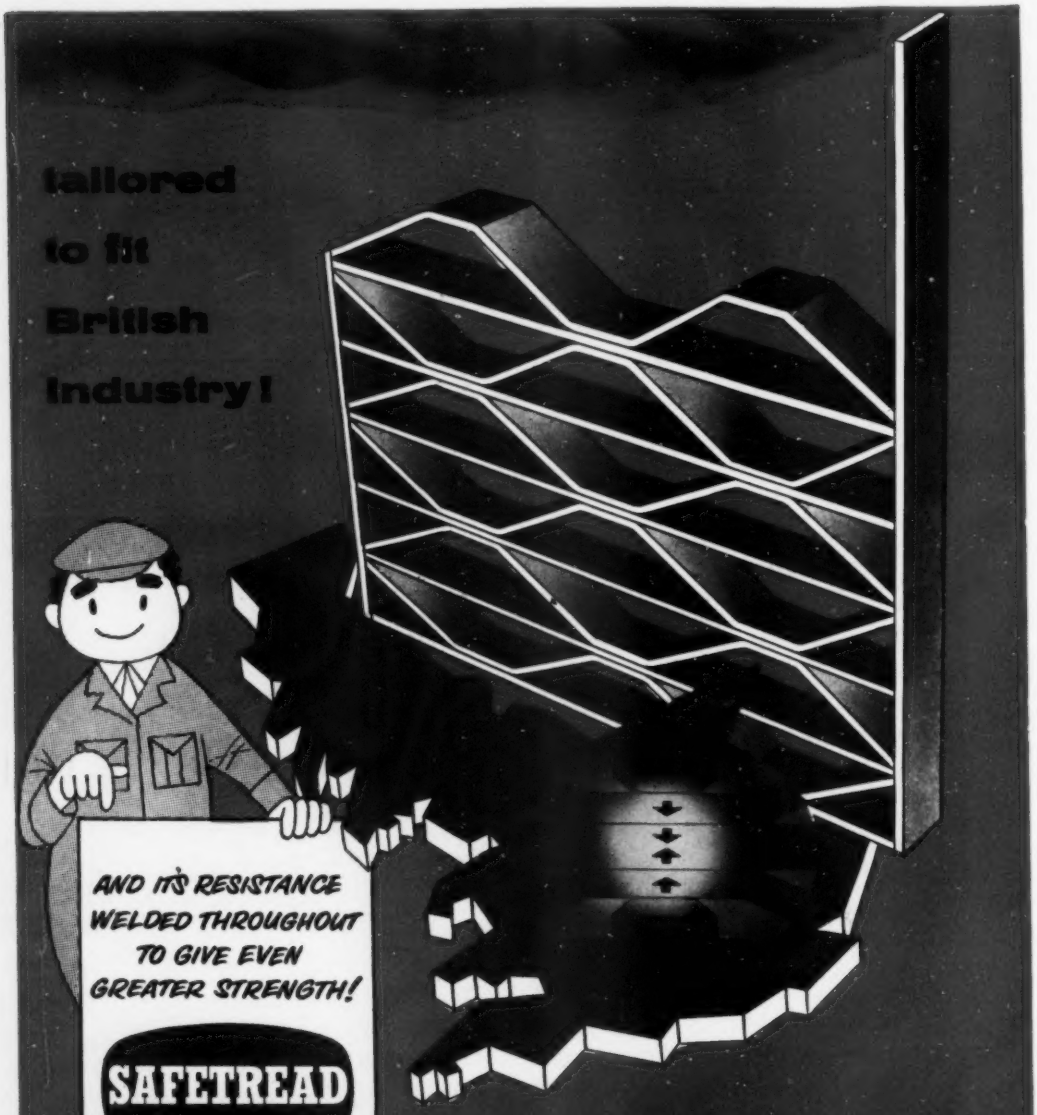
COLLIERY CONVEYOR BELT LACING SYSTEM

MASTABAR MINING EQUIPMENT CO. LTD.

AVENUE PARADE • ACCRINGTON • LANCASHIRE • TELEPHONE: 35411 (3 LINES)

SALES & SERVICE DEPOTS: CARDIFF • LONDON • NOTTINGHAM • LEEDS • ACCRINGTON • NEWCASTLE-UPON-TYNE

tailored to fit British industry!



WELDED STEEL FLOORING

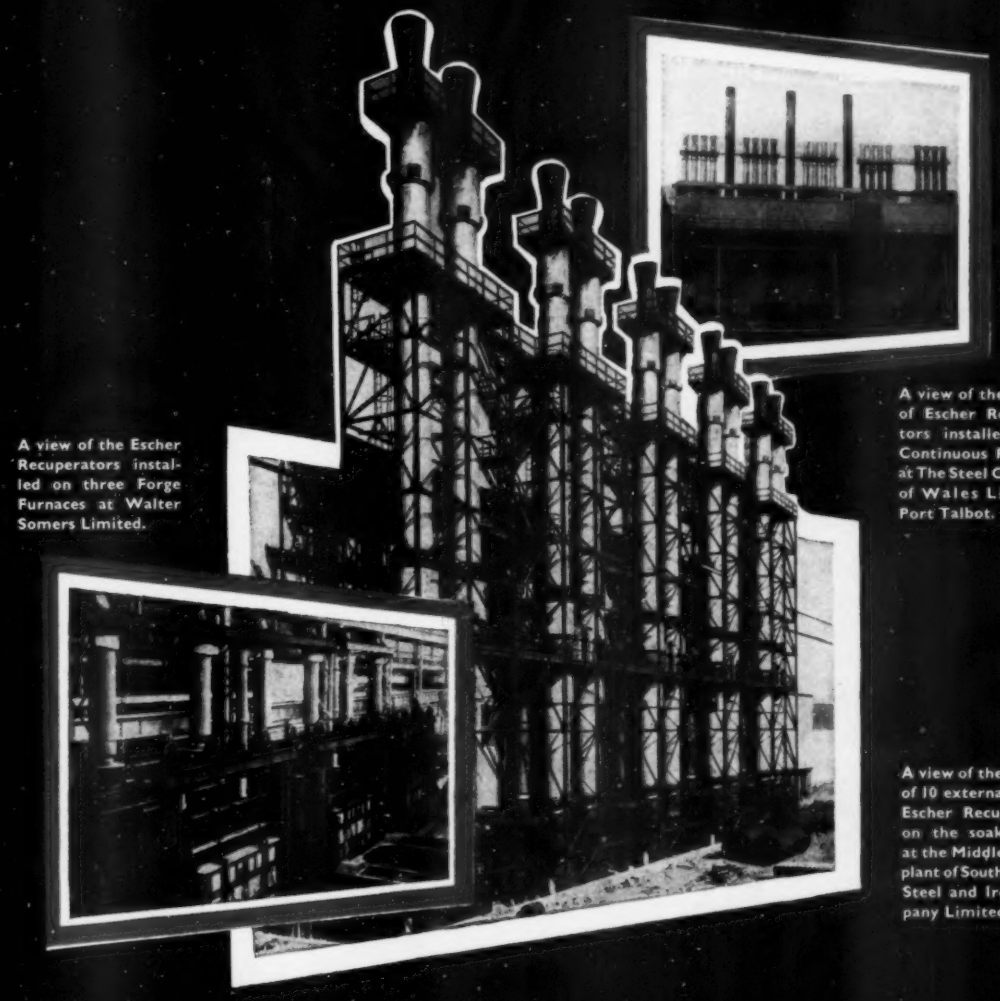
Acclaimed throughout industry, "SAFETREAD'S" unique design combines toughness, rigidity, and anti-corrosion properties second to none. It is literally "tailored to fit" your most intricate flooring needs. The test of time proves that "SAFETREAD" floors have withstood many years of the most arduous and rigorous conditions, and that the point of welding is where corrosion has had least effect. This is because "SAFETREAD" is homogeneously resistance welded under pressure—the grain of the materials is thus closed and a highly corrosion-resistant joint results. Welded in this way, through the neutral axis of the main bar, maximum strength and lateral stability is also gained. Write today for further information on the unique "SAFETREAD" method of fabrication and a copy of the "SAFETREAD" catalogue—it includes safe load tables, deflection tables, and many other valuable facts and figures.

ALLAN KENNEDY & CO. LTD.

MARITIME STREET, STOCKTON ON TEES

Tel: Stockton 65484 (4 lines) Grams: 'Grating' Stockton on Tees London Office: Aldwych House, Wilton Rd., S.W.1. Tel: VIC 2538

P. 4894



A view of the Escher Recuperators installed on three Forge Furnaces at Walter Somers Limited.

A view of the line-up of Escher Recuperators installed on 5 Continuous Furnaces at The Steel Company of Wales Limited, Port Talbot.

A view of the battery of 10 externally sited Escher Recuperators on the soaking pits at the Middlesbrough plant of South Durham Steel and Iron Company Limited.

Nearly 1,000 Escher Recuperators

—by turning waste heat into preheat—

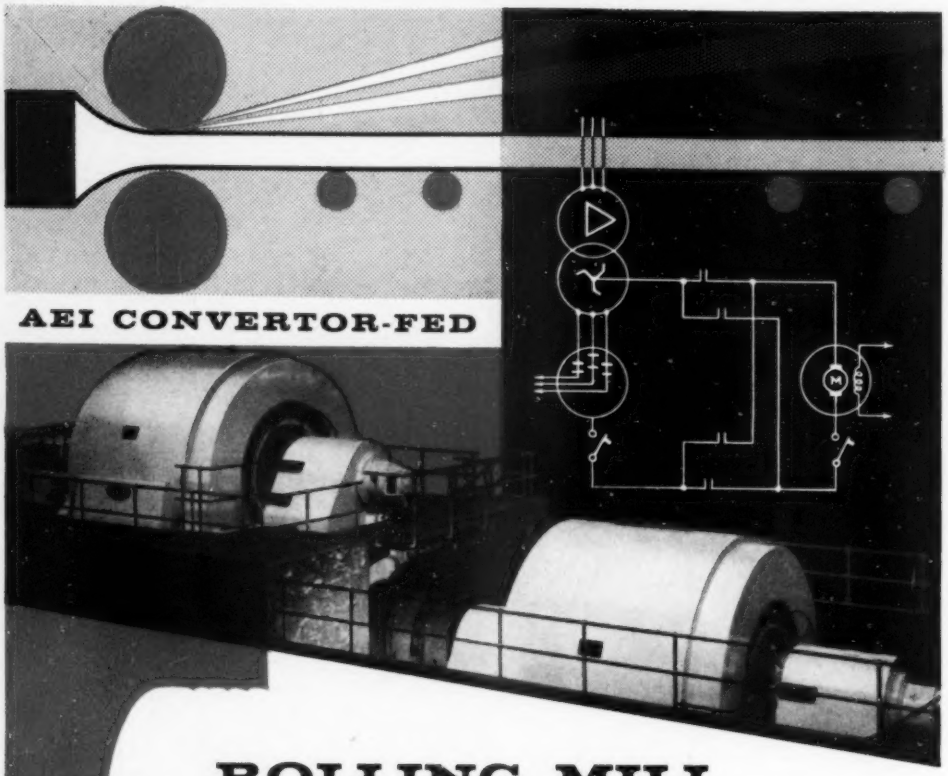
are cutting the cost of world steel production

S&A Escher Recuperators—accept gases at full furnace temperature; provide high preheat temperatures for air and gas; incorporate automatic safeguard against overheating; include a simple and light damper system without leakage or loss of draught; eliminate the need for a separate chimney or excavations; have no "hot spots"; are of such a configuration as to prevent slag or dust deposits; provide easy access to all parts making for low maintenance costs. These advantages combined with Escher reliability explain the continuing demand. May we visit you to also discuss the Hollow Tie Escher Recuperator?

Stein & Atkinson Ltd.

Westminster House, Kew Road, Richmond, Surrey

CHEMICAL ENGINEERS



ROLLING MILL
DRIVES

LOW POWER CONSUMPTION...

...AND LOW CAPITAL COST

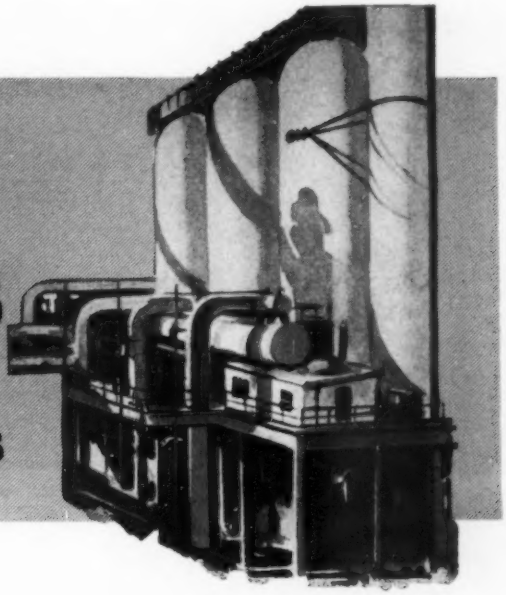
AEI mercury-arc convertor-fed drives give you these important cost-saving advantages. In addition, the foundations required for the convertors will be much simpler—and cheaper—than for the equivalent motor-generator sets.

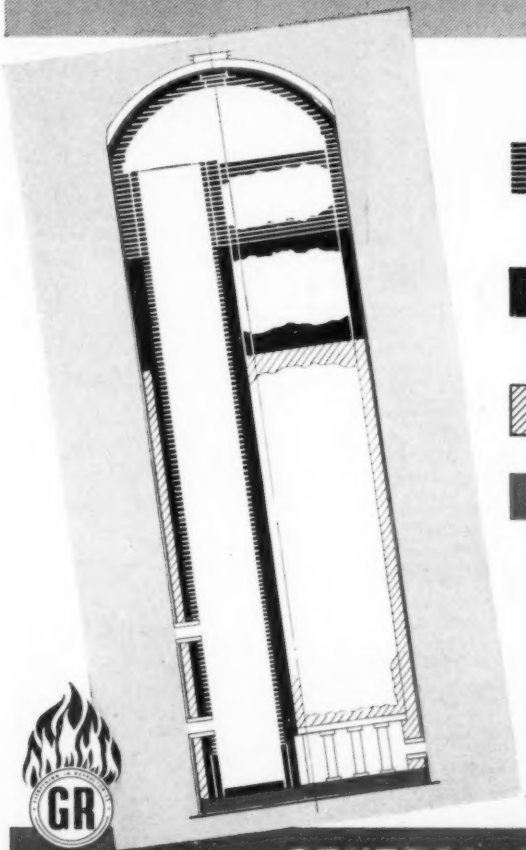
AEI led the way in developing convertor-fed drives. Our specialist engineers will be glad to give you the benefit of their expert advice and unique experience. *Please write to:*

Associated Electrical Industries Limited
Heavy Plant Division
RUGBY, ENGLAND

A5644

'GR' REFRACTORIES in Hot Blast Stoves





SILLMAX 54

For use in combustion chamber skin lining, upper ring wall, inner dome lining, and top chequer filling when high hot blast temperatures are required.

FOSTER CROWN

For use in outer combustion chamber lining, intermediate ring wall positions, outer dome lining and intermediate chequer filling.

FOSTER HIGH GRADE

For use in main lower ring wall and bottom chequer filling.

INSULATION

Efficient insulation effects considerable fuel saving and assists in obtaining maximum thermal efficiency.
G.R. Amberlite Insulation products both in brick and slab form, cover all applications in hot blast stoves and ancillary plant.

Suitable jointing cements, ramming and gunning compositions are available for use in conjunction with the various hot stove refractories described above.

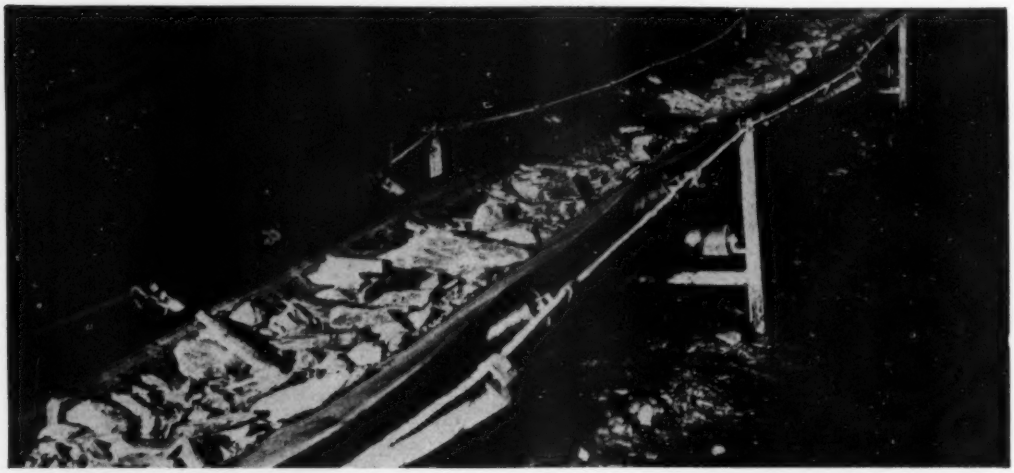
GR

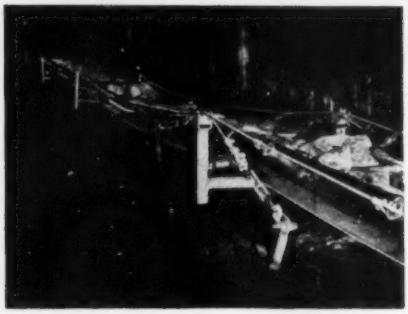
The GENERAL GROUP for everything in Refractories

GENERAL REFRACTORIES LTD.

GENEFAX HOUSE · SHEFFIELD 10 · GREAT BRITAIN

441





(above and left) Fed by a gathering arm loader, this 30" rope belt conveyor at Calverton Colliery is loading out stone.

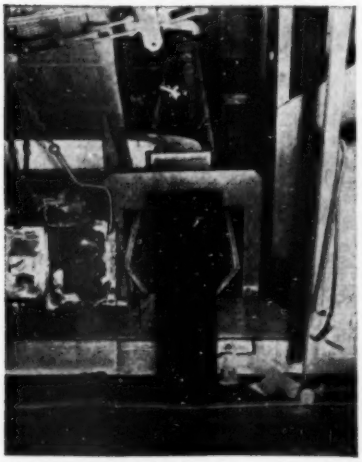
This easy-to-install conveyor structure gives resilient support to the load; this reduces spillage and prolongs belt life. Dust-collecting surfaces are negligible. Throughout the world, mines are turning to rope belt structure because of the savings that it offers in belt costs and manpower.

Complete set of components for 200' of rope belt conveyor structure stacked in an area of 28 sq. ft. Considerable cost saving is achieved through absence of storage or transport problems underground.

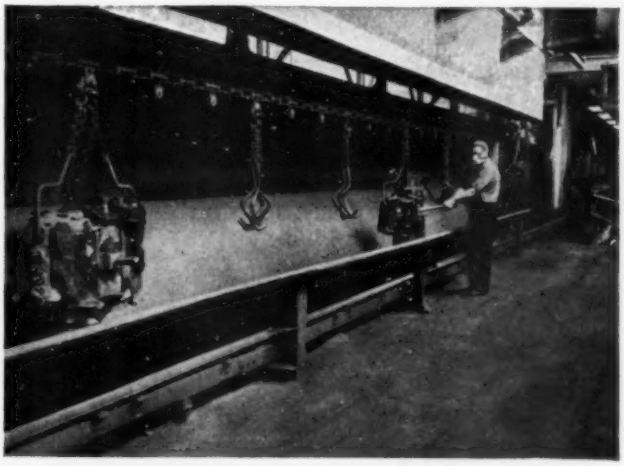
DISTINGTON-GOODMAN RESILIENT ROPE BELT CONVEYOR STRUCTURE
PATENTED

(right) Ropebelt Structure showing the increased wing angle of the idler assemblies under load. The steel framework of a drive section in the background is not part of the standard belt structure.

DISTINGTON ENGINEERING COMPANY LIMITED WORKINGTON CUMBERLAND ENGLAND
BC10

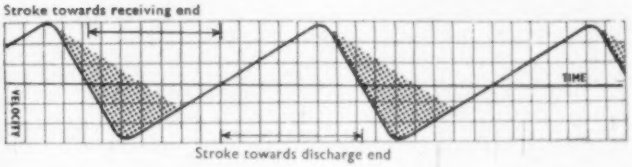


Shaker conveyor discharging scrap on to a similar conveyor. (The photographs reproduced in this advertisement are published by courtesy of Ford Motor Company Limited.)



Sand cores and risers from engine component castings fall on to a shaker conveyor which carries them to a rotary scrap breaker and sand separator.

Shaker conveyor showing type G 20 drive, driven by a 20 h.p. flywheel motor; this robust drive delivers high peaks of energy.



SHAKER CONVEYING

in a mechanised foundry

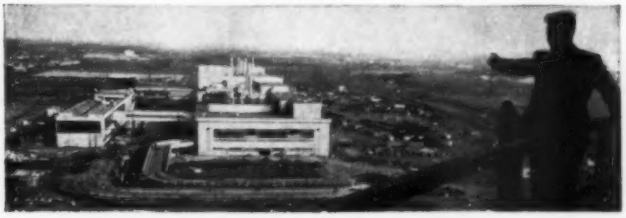
The Distington-Goodman shaker conveyor is not a jigger conveyor. Its troughs move in only one plane on ball-bearing rollers and propel material by variations in their rates of acceleration and deceleration (these are shown in the time-velocity curve above: the shaded areas represent the movement of material independent from the movement of the troughs).

Distington-Goodman shaker conveyors have been used for many years for loading and conveying coal and rock. Their robust all-steel construction makes them ideal for handling hot materials in foundries and cement clinker and sinter.

They are easily extended and contracted and can be made self-loading from stock heaps. Lines of troughing can be made to deviate through angles up to 90°. Conveying capacity depends upon several factors but would normally exceed 60 t.p.h. on the level.

DISTINGTON ENGINEERING COMPANY LIMITED

WORKINGTON · CUMBERLAND · ENGLAND



DB.2

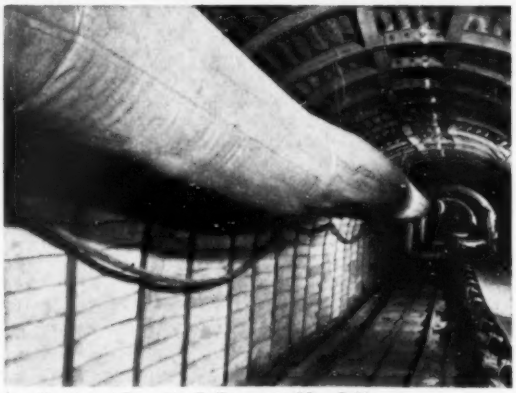
BIC-4

Congratulations... you must be the chap who suggested we change to plastic ventilating ducts reinforced with HIGH-TENACITY RAYON. A brilliant idea—well done!

Plastic ventilating ducting with HIGH-TENACITY RAYON—
Is more easily assembled than metal ducting.
Is lighter and more portable.
Withstands rough treatment.

Ducting reinforced with HIGH-TENACITY RAYON lasts longer and is more economical than plastics ducting reinforced with other textiles.

Courtaulds Limited, 16 St. Martin's-le-Grand, London, E.C.1



In a Heading at Thoresby Colliery, near Mansfield
Photograph by courtesy of British Geon Ltd.

Courtaulds yarns and fibres in the fabric of industry

With the Hanmade Anti-breakage Storage Bunker haulage breakdowns, derailment or shaft hold-ups need not stop production. Normally coal can proceed "straight through" but in the case of bottle necks out-bye of the bunker, production can be turned into the Bunker and unloaded later in the shift.
Advantages?
Greater flexibility of output, less coal degradation and increased production.

Requires only one man to operate.

Developed in conjunction with the Mechanization Dept. of Area 1 East Midlands Division of the National Coal Board.

hanmade
anti-breakage
storage
bunker

HANMADE CONVEYOR CO. LTD., WINIFRED STREET, HUCKNALL NOTTS. Telephone 3448/9

Essential reading for every modern engineer

Brings you right up to date on Molybdenum Disulphide lubrication with ROCOL MOLYBDENISED LUBRICANTS. Brief, factual and complete—specially written and designed for fast reading. Contains over 60 actual case histories.

WRITE TODAY FOR YOUR FREE COPY!

Rocol ROCOL LIMITED, DEPT. L

GENERAL BUILDINGS, ALDWYCH, LONDON W.C.2. Tel: HOLborn 1985
ROCOL HOUSE, SWILLINGTON, Near LEEDS. Tel: Garforth 2261

7862

Vol. 183
No. 4861

IRON & COAL
THE IRON AND COAL TRADES' REVIEW

SEPTEMBER 15, 1961

ESTABLISHED 1866
Incorporating "STEEL and IRON" and "COAL"

Organ of the National Association of Colliery Managers and the Association of Colliery Managers in India

Published each Friday

Annual Subscriptions: United Kingdom....52s. Abroad....60s. Payable in advance.

Editor:
F. H. HARLEY

Assistant Editor:
P. E. CARDEN

Metallurgical Editor:
C. W. J. CRAWFORD, A.I.M.

Mining Editor:
H. COOPER, A.M.I.MIN.E.

News Editor:
R. M. HOWIE

Associate Editors:
J. J. CALEY and B. M. DAVEY

District Representatives:

E. G. COLLIS (Southern) Tel.: TRAfalgar 6171

A. D. H. CURRIE (Northern) Tel.: Ringway 2452

E. J. SWEETING (Midlands) Tel.: Plumtree 2585

T. H. SMITH (Scotland and N.-E. England) Tel.: Dumbarton 1046

Production Manager:
R. J. LOVELL

Publisher:
H. J. DWYER

Circulation Manager:
E. T. GRIFFITHS

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LTD.

Directors:
F. BARRINGTON HOOPER *Managing Director*
F. H. HARLEY
JOHN HOOPER
V. C. FAULKNER
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)
Telegraphic Address: "Zacatecas, Rand, London."

In this Issue—

IRON AND STEEL INSTITUTE
Works Visit: United States Steel Corporation - - page 563

SELF-ADVANCING ROOF SUPPORTS
Application at Cortonwood Colliery - - - - page 569

ORE-HANDLING INSTALLATION
GEC Plant for Lysaght's Scunthorpe Works - - page 579

MINING OVERSEA
Reports from Journals Abroad - - - - page 584

MATERIALS IN THE BLAST FURNACE
Relation Between Gas Flow and Distribution - - page 587

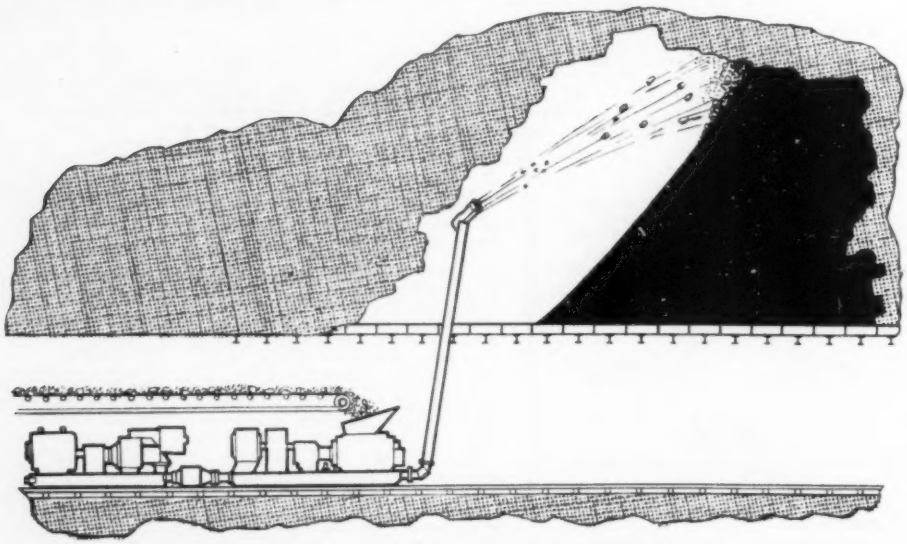
	PAGE
Leading Article: Coal Handling	553
Passing Thoughts	554
New Technical Director for FBI	554
Steel Output in August	555
Special Furnace Order for Wild-Barfield	555
On a Bicycle Made for Two	556
Safety in Mines Conference	556
Coal Price Stability	557
Will Paynter Resigns from Health Committees	557
Appointments	558
Steel and the Common Market	559
Record Steel Output by Mannesmann	559
Personal	560
RTB Works Appointments at Ebbw Vale	560
Machines Win More Coal	561
Mr. Gerard Young is New Master Cutler	562
Law Cases	562
Costs of Roof Bolting	578
Heating, Ventilating, and Air-conditioning Exhibition	578
Fuel Efficiency in India	578
Bigger Ore Fleet for Grangesberg Company	580
New Literature	581
Forthcoming Events	582
Book Review	582
Interesting Casting Operation	583
Tasmanian Steel Proposals	583
Safety Device for Slowbanker	586
Use of Water Power in Mines	586
New Process Finned Tube for Nuclear Power Station	588
Industrial Results in Bulgaria	588
Coal Production in India's Third Plan	589
Linear Motors for Conveyors	590
State of Carbon in Liquid Cast Iron	591
New British Chemical Standards	591
New Patents	592
Continuous Steelmaking	592
Planned Policy for Fuel	593
Miners' Leader Calls for 40-Hour Week	593
Birmingham's New Engineering and Building Centre	594
New Tube Investments Works in North East	594
Inter-firm Comparisons Show "Best" Can Improve	594
Progress With Safety	595
Coal Exports Improve	595
Orders Placed	596
US Steel Firms Warned Against Price Rise	596
Iron and Steel Trade	597
Ore Chartering	597
Coalfield News	598
The Coal Trade	599
Coal Stocks Position	599
Board Changes	600
British Exporters Get Blunt Advice	600
Obituary	601
Company News	602
News in Brief	603
Manpower Inquiry Urged in British Shipyards	604

STONE DISPOSAL

BREAK IT
with a Markham Primary Breaker

PACK IT
with a Crusher Stower

BLAST IT
with a Markham Inbye Blower



MARKHAM

pneumatic stowing equipment

for Information write:—

MARKHAM & COMPANY LIMITED

BROAD OAKS WORKS · CHESTERFIELD · ENGLAND

IRON & COAL
THE IRON AND COAL TRADES REVIEW

Vol. 183 September 15, 1961 No. 4,861

Coal Handling

MECHANIZATION of underground mining operations has proceeded apace over the years. Statistics compiled by the Ministry of Power show that last year 91 per cent. of the country's coal output was cut mechanically, and 95 per cent. was mechanically conveyed. These percentages compare with 74 and 73, respectively, in 1946, the first full post-war year. Now the impetus is being directed to power loading, which accounted for 38 per cent. of the production last year, compared with only 2 per cent. in 1946. Once the coal is out of the pit the history of mechanization progress is less impressive. A lot remains to be done before it can be claimed that the industry is making full use of mechanical aids in handling coal on the surface, and there is room still for advances and improvements in mechanical cleaning.

Much more has been done to mechanize coal handling away from the collieries than may be apparent from a casual look at a country coal wharf, but the surface has only yet been scratched. Not only retail coal depots cry out for a greater use of mechanical aids: there is scope for more mechanization and less reliance on manual work at colliery landsales and on the premises of industrial coal consumers, large and small. For this reason, the Combustion Engineering Association is to be commended for its initiative in staging a working display of modern equipment specially planned to interest the industrial user of coal and the coal trade. The display has been arranged with the help and approval of the National Coal Board and the co-operation and interest of the Coal Merchants' Federation of Great Britain. It will be staged at Salford (Lancs) Goods Station on Tuesday, Wednesday, and Thursday of next week, and has been deliberately designed to give a representative working demonstration of a wide range of mechanical handling equipment laid out to show how the various items can be fitted into complete schemes of mechanized handling.

The mechanical handling of coal and ash is an essential part of modern boilerhouse operation. Many factories now incorporate conveyor systems from an outside store to the boiler hopper, but there is still much that can be achieved by the use of existing equipment, and research is being carried out by the British Coal Utilisation Research Association to see what further improvements can be made. Knowledge of the many items of modern handling equipment now available, particularly of appliances suitable for the smaller boiler plant and for the coal distributive trade, warrants wider dissemination and, especially, practical demonstration, and these needs the Salford display will help to fill.

The subject of mechanical handling of coal at depots is one of great importance for the future of the distributive trade. Because circumstances vary so much at depots throughout the country no one method of mechanical handling can claim universal application, but there are few depots that could not benefit from the introduction of mechanical aids. Neither the National Coal Board nor the distributors have been unaware of the potentialities of mechanization, and the machinery and appliance manufacturers have been quick to meet requirements and to anticipate them.

The volume of trade determines the extent of mechanization at any particular depot. The greatest advantage is obtained when coal can be taken in trainloads of special trucks and passed through a co-ordinated system which rescreens, weighs, and bags the coal mechanically. This calls for the handling of large tonnages regularly, and there are installations of this kind operating in the domestic trade. There are available, too, specially designed road vehicles which can give conveyor delivery of bulk supplies into store or automatically bag and weigh hundredweight lots at the buyer's premises. Storage in hoppers loaded and discharged by crane and grab is becoming common practice at depots in the higher tonnage range, while for smaller tonnages there are such useful mechanical aids as bagging machines, mechanical loaders and wagon discharge appliances, sack lifters, and mobile conveyors. The growing popularity of prepacked fuels has brought with it new techniques, and there is now on the market a coin-in-the-slot coal vending machine.

The coal distributive trade is not standing still in this mechanical age. In some circumstances the old methods of unloading, loading, and delivering of coal by hand are still the cheapest and best, just as there are still, even in these modern times, pits where the coal is largely hand-got. But the wind of change is blowing as strongly over the coal trade as it is elsewhere, and the machine will be increasingly brought to the aid of the coalman as the years go by. At its best, mechanization brings economy in operation and greater consumer satisfaction. At its least beneficial level, it helps to solve labour problems in the coal trade which daily become more difficult.

Copies of the Index to Vol. 182 are obtainable (post free) on application to the Publisher.

Passing Thoughts . . .

WE are concerned not merely that we should maintain our share of world trade which we are losing at the moment, but that we should expand that share. This will need a superhuman effort if at the same time we have to face discrimination. Membership of the Common Market is not the answer to all our problems. In exports, opportunities are nothing if they are not taken and we are not taking our opportunities now.—SIR ALAN BIRCH, General Council, speaking at the TUC annual congress.

Those of us concerned with export get little encouragement from HM Government. If and when it is sufficiently courageous to translate its words of exhortation into action it will be a memorable day for this country.—MR. B. WATSON, *chairman and joint managing director of Expandite, Limited.*

Going into the Common Market means an economic battle which must be waged by management and men in unison. Industry must be forced to increase efficiency and cut profit margins. . . . We are seeking cover under the common umbrella because we are afraid that we may starve from exposure. Declining trade, increased tariffs, and a lethargic export industry will make "the workshop of the world" look like an American "ghost town."—MR. ROY MASON, Labour MP for Barnsley, speaking at Barnsley.

It was your bombing raids that gave us the advantage. Your bombs meant that I was able to start from scratch. They gave me the chance, which your yards have never had, to modernize everything at one stroke and put in all the latest equipment. It was like a dream.—HERR WILLI SCHLIEKER, *a German shipbuilder, talking to Mr. Ernest Marples, Minister of Transport.*

Even so far back in history as 1552, in the reign of Edward VI, some 27 days were appointed by law as days on which all kind of labour ceased. There is certainly food for thought in the reflection that mediaeval society could afford holidays that modern society, with all its vaunted technical and economic achievements, seems unable to afford.—MR. W. COCKIN, Amalgamated Engineering Union, speaking at the TUC annual congress.

This argument takes no account of Saturdays. The man who works a five-day week, has two weeks' annual holiday, and four public holidays is not working on a total of 66 weekdays in each year. It is this which should be contrasted with the holidays of the mediaeval workman who worked a six-day week.—Letter in The Times.

It will be hard to have much confidence in the value of the TUC as an active partner in the Chancellor's planning machinery as long as it continues to turn its blind eye so deliberately on all the most difficult planning subjects within its own immediate sphere of interest.—The Economist.

The modern safe-breaker is undoubtedly more knowledgeable and better equipped than ever before.— The HON. GEORGE C. H. CHUBB, *chairman and joint managing director of Chubb & Son, Limited.*

One or two of the most effective managers I know are mad as hatters and life is not particularly easy for their subordinates, but they get things done. . . . It might well be that some degree of neurotic insecurity makes for executive drive in some situations.—MR. A. G. P. ELLIOTT, personnel director of Standard Telephones & Cables, Limited, addressing the sociology section of the British Association.

The big trouble facing us today is that the gap between the hard-working and intelligent and the lazy and unintelligent is miles too small. This country, and the export trade of this country, by and large, depends upon not more than 5 per cent. of the population.—CLLR. LIONEL FARRIS, *a Sheffield wire manufacturer.*

The Common Market can be for us a free market, almost as big as the US, and it must help this country. The number of manufacturers who will benefit is much greater than the small number who will fall by the wayside.—SIR CHARLES HAMBRO, chairman of Hambros Bank, Limited.

New Technical Director for FBI

IN succession to Major-General A. J. H. Dove, who is leaving at his own request at the end of October in order to devote more time to voluntary work, Dr. D. H. Sharp has been appointed director (technical) of the Federation of British Industries. He will be responsible for the administration of a wide range of policy and services.

Dr. Sharp, who is 44, inaugurated the research department of Sutcliffe, Speakman & Company, Limited, makers of brick and briquetting machinery, solvent and benzol recovery plant, etc., of Leigh (Lancs) immediately after the war, and was later engaged on studies of the continuous firing of pottery and on fuel efficiency matters for the British Ceramic Research Association. In 1951 he accepted the invitation to join Pest Control, Limited, to apply special liquid phase adsorption techniques to a difficult effluent disposal problem. He is at present assistant to one of the managing directors of Fisons, Limited, which acquired Pest Control in 1954.

RTB Managers to Visit Russian Steel Plants

THREE managers from the Spencer and Ebbw Vale works of Richard Thomas & Baldwins, Limited, are to pay an official visit to Russia soon to inspect steel plants there. Permission for the visit, which is expected to last between two and three weeks, has been received from the Soviet authorities, but no details of dates or itinerary are yet available. The Russians are asking in return to send their own representatives to RTB works.

The three RTB managers are Mr. A. J. Burgess, ironmaking manager, Spencer Works; Mr. W. R. Harrison, blast-furnace manager, Spencer Works; and Mr. Cedric Penry, coke and iron manager, Ebbw Vale. They will be the first visitors from the company to go to Russia to see steel plants and, more especially, the blast furnaces. It is hoped that the visit will take place before the end of the autumn.

WILKIE & PAUL, LIMITED, tin box and canister manufacturers, of Edinburgh—The company's capital has been acquired by Scoteros, Limited, the Scottish industrial holding company, for £99,600 cash and the allotment of 68,000 6½ per cent. £1 preference and 80,000 ordinary 5s. shares in Scoteros.

Steel Output in August

TWO FACTORS IN DECLINE ON 1960

TWO reasons are put forward by the Iron and Steel Board in its monthly production statement published yesterday (Thursday) for the considerable drop in steel production in August. Compared with 1960, the decline, it is thought, was to a small extent due to holidays which tended to be taken rather later this year than last. A more important factor was probably a continuation or acceleration of the stock withdrawals which became apparent in the second quarter of 1961, whereas last year there was a stock increase.

Production of steel in August was at an average weekly rate of 338,400 tons, compared with 380,200 tons a week in July and with 422,900 tons a week in August, 1960. Pig-iron production last month was at a weekly average of 264,900 tons, compared with 276,600 tons in July, and with 291,400 tons in August, 1960.

Latest pig-iron and steel output figures (in tons), with the corresponding 1960 returns, are shown in the following table:—

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1961—June ..	297,400	15,463,000	447,500	23,268,000
July	276,000	14,381,000	380,200	19,771,000
August ..	264,900	13,774,000	338,400	17,595,000
1st 8 months	296,200	15,400,000	440,800	22,923,000
1960—June ..	295,200	15,353,000	466,400	24,255,000
July	288,900	15,024,000	391,400	20,355,000
August ..	291,400	15,152,000	422,900	21,988,000
1st 8 months	299,600	15,578,000	459,000	23,870,000

£500,000 Export Orders for Steel, Peech & Tozer

EXPORT orders worth £500,000 have recently been secured by Steel, Peech & Tozer branch of the United Steel Companies, Limited. They were gained in the face of fierce competition, particularly from continental steelmakers. Largest individual order came from behind the Iron Curtain. Centrozap, the central buying agency for iron and steel in Poland, has called for 4,300 tons of steel bars and further small tonnages of hot rolled strip.

Other orders for railway wheels, tyres, and axles have been received from Mexico, Finland, India, and Cuba. These orders have been obtained in addition to the normal business with regular export sources, and from British Railways and other carriage and wagon builders in this country. Deliveries will begin immediately and will extend over the next few months.

ACTUAL PRODUCTION of raw steel in the United States during the week ended September 11 totalled 2,032,000 net tons, an increase of 0.1 per cent. on the previous week, according to the American Iron and Steel Institute. Production of raw steel in the current year to date totalled 64,172,000 tons, a fall of 14.6 per cent. compared with the same period last year.

Special Furnace Order for Wild-Barfield

FOR the heating of bearing rings 7 in.-12 in. in diameter, followed by oil quenching, Hoffmann Manufacturing Company, Limited, Chelmsford (Essex) has ordered a continuous furnace capable of treating work at the rate of 80 lb./hr. from Wild-Barfield Electric Furnaces, Limited. The furnace will be of the mesh belt conveyor type. Components will be fed to a hopper and loaded on to the belt pneumatically, conveyed through the heating chamber and discharged sideways, also pneumatically, on to a four-station arbor for quenching and subsequent discharge into a catch basket.

The furnace itself will be heated by tubular elements of nickel-chromium alloy fed at low voltage from transformers and arranged in two zones to give a total furnace rating of 65kW. Work will be conveyed upon a 14-in. wide mesh belt made from nickel-chromium alloy wire and carried upon rollers, one of which will be driven by means of a ratchet wheel operated by a pneumatic cylinder, the stroke of which will be controlled by limit switches as to length and by process timer as to frequency. By this means, control of the speed of work through the furnace will be achieved.

Spencer Works is Tribute to British Industry

WHEN Mr. Henry Brooke, Minister for Housing and Local Government and Minister for Welsh Affairs, visited the site of the Spencer Steelworks of Richard Thomas & Baldwins, Limited, at Llanwern, near Newport (Mon), last week, he stated it was a remarkable tribute to British industry that such a large works could be built so quickly. On his tour of the 3½-mile site, Mr. Brooke was accompanied by Mr. Henry F. Spencer, managing director of RTB, Lord Cosford, adviser to RTB on foreign affairs, and Mr. W. O. Campbell-Adamson, general manager of the works.

Before the end of this month the first cargo of iron ore for the works is expected to arrive at Newport docks, and production will probably be started by spring of next year.

THE Northern (N&C) Divisional Coal Board is to construct a surface drift mine at Whittle Colliery, Alnwick (Northumberland).

Orders Placed

Weighing Equipment for Spencer Steelworks

CONTRACT has been placed with Craven Electronics, Limited, Bingley (Yorks), an associate company of Richard Sutcliffe, Limited, for the supply of electronic weighing equipment to be installed at the Spencer Works of Richard Thomas & Baldwins, Limited, now under construction at Llanwern, near Newport (Mon).

The order calls for 17 weighers which will weigh materials passing over belt conveyors and will transmit the continuous weights to remotely placed instruments. The conveyors, which are up to 48 in. in width, will carry loads up to 900 tons per hour of sinter, coal, coke, wet ore, dried and crushed ore, and limestone. Delivery of the weighing equipment will be spread over the next seven to eight months.

MINISTRY OF AVIATION contract to supply a further quantity of radiac survey meters has been awarded to Avo, Limited, a company in the Metal Industries, Limited, group.

INSTRUMENTATION for Trawsfynydd nuclear power station, North Wales, which is due to be commissioned in 1962, is to be supplied by George Kent, Limited, Luton (Beds). The order is worth £32,000.

UNDER AN Admiralty switchgear contract for the re-electrification of the Portsmouth Dockyard, South Wales Switchgear, Limited, is supplying 47 switchboards, worth more than £125,000, and totalling about 170 panels.

BRITISH RAILWAYS (North-Eastern Region) has placed contracts with the Westinghouse Brake & Signal Company, Limited, and Enfield-Standard Power Cables, Limited, for the supply of signalling equipment for the new marshalling yard under construction at Lamesley (Co. Durham).

CONTRACT FOR the supply of 48 in. dia. bolted gland spun iron pipes and fittings has been awarded to Stanton & Staveley Sales, Limited, near Nottingham, by the Birmingham Tame and Rea District Drainage Board. Worth about £176,000, the order is for the Yardley and Tyburn main sewer.

ORDER WORTH £231,000 has been received by Associated Electrical Industries, Limited, from the State Electricity Commission, Victoria, Australia, for 6.6 kV auxiliary switchgear for the Commission's Hazelwood power station. It will be manufactured mainly in the UK factories of AEI switchgear division, though certain contactors, and panels will be made in AEI factories in Australia.

CONTRACT WORTH nearly £2,000,000 for the building of a complete ammonia plant to be erected at Grenaa, Denmark, has been awarded to the Power-Gas Corporation, Limited, a member of the Davy-Ashmore, Limited, group. The plant forms part of a new fertilizer factory for Dansk-Norsk Kvaelstoffabrik, of Copenhagen. Power-Gas is responsible for design, procurement, erection, and commissioning.

HEAD WRIGHTSON PROCESSES, LIMITED, a subsidiary of Head, Wrightson & Company, Limited, has been awarded a water treatment plant contract worth approximately £150,000 by Esso Petroleum Company, Limited, for its Fawley refinery. The plant is the first stage of an expansion of the boiler feed water facility and will initially handle 1,000,000 gallons a day, although mains and services will be sized to handle the final flow of 4,000,000 gallons.

US Steel Firms Warned Against Price Rise

WARNING against a price increase this autumn by the US steel industry was issued last week by President Kennedy. He said in a letter to 12 major steel company executives that higher prices would force similar increases in many industries, and the consequences might be so grave as to necessitate restrictive monetary and fiscal measures which would "retard recovery, hold unemployment at intolerable levels, and hamper growth." The depressing effect of such measures on the industry's rate of operations might in the long run more than offset the profit-raising effect of a price increase. He said the companies could look forward to good profits without a rise in prices, in spite of the wage increases they will have to pay next month under the labour management contract of 1960.

Wages in the steel industry will rise by 7 to 10 cents an hour in October, and there has been speculation that prices would be raised by $5 a ton. Mr. Kennedy's arguments are based on calculations by his economic advisers which indicate that the steel industry can earn profits ranging from 7 to 15 per cent. in the fourth quarter—even after wage increases. The variation depends on whether the industry is operating close to 70 per cent. or close to 90 per cent. of capacity in the period.

President Kennedy suggested that restraint on the part of steel producers would have to be matched by unions when negotiations for a new three-year contract begin next spring. He said the industry would enter these negotiations with a record of 3½ years of price stability, and it would clearly be up to labour to "limit wage demands to a level consistent with continued price stability."

The industry last raised prices by $4.50 a ton in the middle of 1958, and since then companies have absorbed a rise of about 10 per cent. in labour costs. This year the industry is expected to spend some $1,200,000,000 on modernization and expansion, compared with $1,500,000,000 last year.

Greece Plans Steel Industry Based on Local Ore

FIRST formal step has been taken in Greece to set up an iron and steel industry based on local iron-ore resources. At present, all steel produced in the country is manufactured from scrap iron. The Industrial Development Corporation of Greece has undertaken the establishment of the new industry, planned to be the largest in the country, by setting up a company named the Iron & Steel Corporation of Greece, Limited, with an initial capital of 250,000,000 drachmas (£3,000,000).

Foreign capital is being sought for future investment in the enterprise, and foreign iron and steel firms are being invited to contribute capital and know-how. In its initial stages the plant will be geared to an annual production of 250,000 tons of steel, with a rapid expansion to 1,000,000 tons in view. To promote competitive conditions in the new industry, the Government is allowing the private enterprise firm Halivourgiki, which is responsible for Greece's present steel production of some 75,000 tons, to instal a blast furnace of its own, and this plant is now being built.

Coal Price Stability

NCB CHAIRMAN'S CONFIDENT ASSERTIONS

"WE will be able to absorb mounting costs and get stability in the price of coal. We are not likely to see nation-wide increases in the price of coal as we did last September." These confident and comforting assertions were made by Lord Robens, chairman of the National Coal Board, at Leicester, last Friday. He was addressing members of the Leicester branch of the Institute of Marketing and Sales Management.

Lord Robens was able to forecast coal price stability because of the vast mechanization plan now under way in the industry. It was, he said, the biggest reorganization plan the industry had known and was intended to increase complete mechanization from 40 per cent. to 80 per cent. of total production by 1965. Four hundred power-loading units had recently been installed in British mines. "By 1965," he added, "we will be at the peak of our ability to produce coal at the cheapest possible price."

The country's heating and energy requirements by the late 1970s would be the equivalent of 300,000,000 tons of coal, he went on. The coal industry aimed at carrying two thirds of this, leaving competition to centre on the odd 100,000,000 tons. There would be plenty of scope for nuclear power, oil, and natural gas.

Coal and Ash Handling Display at Salford

SPECIALLY planned to serve the interests of the smaller industrial user of coal and the coal trade, a working display of mechanical coal and ash-handling equipment will be on view at Salford Goods Station (East Ordsall Lane entrance) from September 19 to 21 from 10 a.m. to 12.30 p.m. and 2.30 p.m. to 4.30 p.m. It has been laid out to show how the equipment can be fitted into complete schemes of mechanized handling. Admission is free.

Invitations are available on request to the Combustion Engineering Association, 70, Jermyn Street, London, S.W.1, which has organized the display.

METHANE FROM FIRST YORKS PIT FOR GAS BOARD

FIRST pit in Yorkshire to make profitable use of methane will be Maltby Main Colliery, near Rotherham. About 250,000 cu. ft. of gas a day is being drained from the pit's seams for safety reasons. It will be sold to the East Midlands Gas Board mixed with ordinary coal gas by a special process, and supplied through the grid.

A number of Yorkshire pits now have methane drainage, but Maltby is the first to have a scheme to sell the gas approved by the National Coal Board.

Will Paynter Resigns from Health Committee

FOLLOWING his rejection by the TUC as a member of the General Council, Mr. Will Paynter, general secretary of the National Union of Mineworkers, has withdrawn his services from three joint committees which deal with industrial injury and health problems—the Industrial Injuries Advisory Committee to the Minister of Pensions and National Insurance, the Workman's Compensation Board, and a committee set up by the Government to report on the Statute of Limitations which limits an employer's liability for a disease contracted at work to three years after a worker has left his employ.

Normally a sitting member of the General Council is re-elected, but Mr. Paynter, who is a Communist, was defeated in this year's ballot by Mr. Fred Collindridge, the non-Communist vice-president of the union. As a miner Mr. Paynter is an expert on industrial diseases, especially lung diseases which afflict workers in mines and quarries.

100 Scots Miners Who Were Late Sent Home

MORE than 100 latecomers on the dayshift were sent home on Tuesday from Polkemmet Colliery, Whitburn (West Lothian), which employs nearly 2,000 men. All were underground workers, and they included engineers and electricians. Colliery manager, Mr. Thomas Smith, told the arriving men that if they were not underground before the 7 a.m. starting time they would be turned away. When the hooter sounded for the start of the shift all those still on the surface were told to go home.

A Coal Board official said late arrival had been going on at the colliery for some time, but discussions with the union had failed to stop it. "The men arrive at the colliery in plenty of time, but after changing into their working clothes they do not proceed to the pithead right away to go underground."

NINE WEEKS from the erection of the first unit until the actual launch of the vessel—that is the latest shipbuilding triumph of Austin & Pickersgill, Limited, Sunderland. If the progress programme is fulfilled, delivery of the ore-carrying motorship Finnamore Meadow should take place in a further eight weeks, to make a record of 17 weeks from the actual start of construction until completion.

Appointments

Head Wrightson Group Management Changes

GENERAL manager of the Head Wrightson & Company, Limited, subsidiary, Head Wrightson Steel Foundries, Limited, since July, 1960, Mr. J. D. ECCLES, has been appointed director and general manager of Head Wrightson Stockton, Limited.

Mr. Eccles, who joined the company in 1954, is a son of Sir David Eccles, Minister of Education. He is succeeded as general manager of Head Wrightson Steel Foundries by Mr. G. F. TAYLOR, a director of the company. The Head Wrightson group also announces that Mr. A. J. LONG has joined the Head Wrightson Export Company, Limited, as general manager.

MR. J. D. ECCLES

Mr. J. S. MCLAUCHLAN has been appointed secretary of David Rowan & Company, Limited, marine engineers, of Glasgow, one of the Lithgows, Limited, group of companies.

Mr. ANTHONY J. CALVEY has been appointed London manager of Smith's Dock Company, Limited, the North Shields and Middlesbrough firm of ship builders, repairers, engineers, etc.

Dr. WILLIAM WHITE EASTON, principal of the technical college at Dounreay Atomic Establishment, has been appointed principal of the new Stirling County Technical College, Falkirk.

Mr. K. G. HUNTLEY has been appointed chief electronics engineer to Adrema, Limited, Telford Way London, W.3, and will be responsible for the formation and building up of the new data processing division.

Mr. E. NICHOLSON has been appointed financial controller of the engineering group of the General Electric Company, Limited. He was formerly a deputy director of the production group of the UK Atomic Energy Authority.

Works manager for Thomas White & Sons, Limited, woodworking machinery manufacturers, of Paisley (Renfrewshire), Mr. J. KING has been appointed works manager for the English Steel Tool Corporation, Limited, Manchester.

Mr. I. F. MCGURK, manager of the Margam melting shop of the Steel Company of Wales, Limited, has been appointed assistant (maintenance) to Mr. R. P. A. MacKay, superintendent of the company's steel plant operations. His successor at the melting shop is Mr. H. N. BOWEN.

One of Britain's early radar experts, Brig. J. D. HAIGH has been appointed by the Plessey Comany, Limited, as general divisional manager of a group of divisions including the wiring and connectors division, the capacitors and resistors division, and Preformations, Limited.

Due to an internal re-organization of Globe Pneumatic Engineering Company, Limited, Romford (Essex), Mr. F. J. HOWARD has relinquished the post of works manager and, as technical director, will concentrate on design. In our issue of August 25 it was inadvertently implied that he had also given up the post of technical director.

Formerly manager of the Croydon office, Mr. D. J. ATKINS has been appointed divisional sales manager of Harris Engineering Company, Limited, makers of heating and air conditioning equipment, of London, S.E.17. He will have charge of the whole of the company's sales activities in the south of England, including London.

Due to increasing responsibilities within the Leyland Motors, Limited, group, which prevent Mr. Stanley Markland spending all the time at Albion Motors, Limited, which he considers necessary, Mr. A. CRAIG MACDONALD, who for several years has been a director and production controller of Albion, has been appointed general manager.

The Nuralite Company, Limited, a member of the British Uralite group, Gravesend (Kent), has appointed the following regional sales representatives:—Northern Region, Mr. HAROLD ASPIN, Mr. EDWARD TURNER, Mr. HOWARD SUDDES, and Mr. KEITH LIGGINS; Eastern Region, Mr. GEORGE BOULTBEE and Mr. MICHAEL BOWERS; Western Region, Mr. EDRYD GEORGE.

Mr. R. F. HOWES has been appointed method study officer for BTR Industries, Limited, thermoplastics and rubber manufacturers, and will be responsible for method study on major engineering projects and plant re-organization throughout the group. He has previously served in the plastics division of Imperial Chemical Industries, Limited, and with the De Havilland Engine Company, Limited.

Leeds manufacturers of light railway equipment, Robert Hudson, Limited, has appointed Mr. MICHAEL J. THEAKSTON, formerly London manager, as export sales manager, based at the Leeds head office. He succeeds Mr. R. A. Hudson, who has taken up specialist duties in the company's manufacturing division. The new London manager is Mr. BERNARD A. VICKERY, formerly sales representative in that area. Mr. Francis Theakston will continue as consultant director at the London office.

Mr. M. W. SEAGER has been appointed chief development engineer of Richard Sutcliffe, Limited, mining machinery and mechanical handling equipment manufacturers, in succession to Mr. Leslie Baines who, as recently announced, has joined the board of Sutcliffe Hydraulics, Limited. Mr. Seager has been engaged in the mechanical handling industry during the past 18 years with Stothert & Pitt, Limited, Sheepbridge Equipment, Limited, and Husband & Company, Limited.

BRITISH-EAST GERMAN TRADE INCREASES

BRITAIN'S import-export trade with East Germany rose by more than £2,000,000 in the first seven months of 1961, compared with the same period in 1960, and more than £5,000,000 compared with the first seven months of 1959. According to figures published by the Board of Trade, British imports from East Germany at July 31, 1961, totalled £4,464,542, compared with £3,962,638 in 1960 and £2,853,426 in 1959.

Exports to East Germany at July 31, 1961, totalled £5,168,163, compared with £4,298,596 in 1960 and £1,667,569 in 1959. Total British-East German trade (including re-exports) for the first seven months of this year came to £11,192,648, compared with £8,706,057 in 1960 and £5,090,220 in 1959.

Steel and the Common Market

BRITAIN SHOULD COMPETE SUCCESSFULLY

PROSPECT facing the British steel industry if integration takes place with the Six EEC countries is on the whole bright, according to the latest of three studies on the Common Market by a leading firm of brokers. The study takes as its starting point the observation several months ago by Mr. C. R. Wheeler, president of the Iron and Steel Federation, that: "For the good of its customers rather than any direct advantages, the steel industry would welcome closer unity with the Six."

The report finds that it should not be hard for Britain to export competitively against other Common Market countries. With only 10 per cent. of the trade likely to be concerned with oversea markets, the real benefit to steel is seen to be likely from the chance for British companies to participate in a huge home market by supplying consumer durables, machine tools, and other products to which our gearing is particularly suited.

It concludes that Britain's steel competitors on the Continent are lively, enterprising, and optimistic. Our steelmakers have no obvious disadvantages (except fuel costs, which can be met), and in general are confident that they will fare well in the new conditions.

Prices and Expansion

The report notes that the success of the European Coal and Steel Community has been achieved in an outstanding growth period, and that it remains to be seen how it will work in less happy days. On prices—one of its two chief concerns—the ECSC has had to let the governments of the member countries have their way. The Authority contents itself with the view that governments bring about low prices, and this is its own object.

Other main concern of the Community is expansion, and in this field the Authority has been able to exercize a much greater influence. The British Iron and Steel Board, says the report, accordingly has to surrender its *raison d'être*, and the Government will have to find some other way of influencing British prices.

According to recent statistics of industrial expansion in France, the steel industry has increased activity by 6 per cent. Production of aluminium products is up 12.2 per cent., chemical products 9.4 per cent., and natural gas extraction 32.9 per cent. While before the war most machinery and other industrial equipment was imported from abroad, France is now not only equipping its own plants but exporting an increasingly large share of its mechanical production to other countries —15 to 20 per cent. of its total output during 1961.

The rate of growth for the whole of French industry is higher than in any other European country, with the exception of Italy, and was between 7 and 7.5 per cent. for the first seven months this year. Although still lower than the German Federal Republic, French industrial investment is estimated to be 10 to 15 per cent. higher so far than last year.

THE United Steel Companies, Limited, industrial film "Stone into Steel" has received the Critics' Circle award for the best short subject at the Stratford (Ontario) International Film Festival.

Record Steel Output by Mannesmann

PRODUCTION of crude steel by the Mannesmann, AG, group, Düsseldorf, Germany, in the financial year 1960, rose by 13 per cent., compared with 1959, and reached a new high level of 2,368,000 metric tons. Production of rolled steel at 1,529,000 tons was 20 per cent. higher than in the previous year. Tube production was 18.8 per cent. higher than in the previous year (excluding large diameter pipes). While production of seamless tubes rose by 661,000 tons, an increase of 21.8 per cent., compared with 1959, output of welded tubes of up to 318 mm. diameter rose by 8.3 per cent. to 166,000 tons. Output of welded large-diameter pipes fell by 35 per cent. to 156,000 tons owing to the lack of large export orders.

The group's coal mining subsidiary had a favourable year as a result of higher productivity and further rationalization, and output increased by 0.8 per cent. to 6,373,000 tons. Coke production also rose by 15.9 per cent. to 2,238,000 tons. Output from the group's ore mines reached 373,400 tons, an increase of 24 per cent.

Total group turnover amounted to DM 4,572,000,000 and external sales rose by 16.6 per cent. to DM 3,535,000,000, while export sales reached DM 883,000,000, representing 27.8 per cent. of total turnover against 29.3 per cent. in 1959.

Opening of First Export Training Centre

FIRST of its kind in the country, Sundridge Park Export Centre, near Bromley (Kent), was opened on Thursday of last week. It has been set up by the Sundridge Park Management Centre to help the country's export drive by providing comprehensive training facilities on a residential basis. A non-profit making organization, it was established in the grounds of Sundridge Park by Personnel Administration, Limited.

Sir Richard Powell, Permanent Secretary to the Board of Trade, said at the opening that the knowledge and training the centre could provide would be valuable in helping to tap the country's export potential. The centre will provide three weeks' residential courses for managing directors, export directors, and senior sales executives concerned with export business. All the main factors affecting export policy and marketing procedures in present world conditions will be studied.

Personal

Chairman of Coke Research Association Council

A MANAGING director (mining and carbonization) of the United Steel Companies, Limited, Lt.-Col. P. F. BENTON JONES has been appointed chairman of the Council of the British Coke Research Association. A director also of many of United Steel's subsidiaries, including Steel, Peech & Tozer, Appleby-Frodingham Steel Company, Samuel Fox & Company, Limited, and Distington Engineering Company, Limited, he has been a member of the association since 1953.

Appointed vice-chairman of the council is Mr. A. H. A. WYNN, who has been scientific and carbonization member of the National Coal Board since January, 1960.

The 250th anniversary of Scotts Shipbuilding & Engineering Company, Limited, Greenock, will be marked by a visit from the DUKE OF EDINBURGH on October 16.

Mechanical engineering craft instructor at the West Wales section apprentice training school of Richard Thomas & Baldwins, Limited, for the past 10 years, Mr. ARTHUR PERKINS has retired.

Mechanical engineer for the No. 1 (North-East) Area of the Durham Divisional Coal Board, Mr. J. M. WILLIS has retired at the age of 62 after 46 years in the mining industry. He became Area engineer four years ago, after five years as assistant chief engineer.

Well-known Sheffield philanthropist, Sir STUART GOODWIN, chairman and managing director of Goodwin & Company, Limited, Neepsend Rolling Mills, Limited, and a director of many other companies, has given £2,000 to the South Yorkshire County Boy Scouts' Association.

For the second time in his career, Mr. EWART EVANS has retired. He has been chief security officer at Port Talbot for the Steel Company of Wales, Limited, since 1957. He was a chief superintendent with the Glamorgan Constabulary and after his retirement from the Force joined SCOW.

For the first time a representative from Britain has been co-opted to the tutorial staff of the European Institute of Business Administration at Fontainebleu. He is Mr. ADAM JOHNSTONE, chairman of Sales Audits, Limited, London, E.C.4, and he has been appointed associate professor of marketing.

Mr. BRIAN LINSLEY (70), returned to the Meadowhall Works, Sheffield, of Ambrose Shardlow & Company, Limited, last week to receive from the Earl of Scarbrough, Lord Lieutenant of the West Riding, the BEM awarded to him in the Birthday Honours. Mr. Linsley had completed 48 years' unbroken service with Ambrose Shardlow before retiring last April.

A THREE-WEEK VISIT to Czechoslovakia, Poland, and Hungary is being paid by Mr. JOHN S. YOUNG, managing director of Jno. S. Young & Company, Limited, machine-tool distributors and engineers' merchants, of Glasgow, and Mr. GEORGE B. YOUNG, secretary of the Scottish Council. They are the first of the Scottish Council to visit these countries on behalf of Scottish industry.

Lt.-Gen. Sir JOHN EVETTS is to retire from the Dowty Group, Limited, and relinquish his directorship of Dowty Fuel Systems, Limited, in order to devote his time, on a voluntary basis, to furthering the aims of the Three Counties Industrial Education Association, of which he is president and chairman of council. Sir John, who is 70, was formerly managing director of Rotol, Limited, a member of the Dowty Group.

Mr. H. A. LONGDEN, chairman of the West Midlands Divisional Coal Board, who is leaving the industry at the end of the month to become deputy chairman and chief executive of the Cementation Company, Limited, will officially open the new baths and other facilities at Florence Colliery, tomorrow (Saturday). Afterwards, at Highley (Salop), he will open a new youth centre at the Miners' Welfare recreation ground.

Nominated by the Derbyshire branch of the National Union of Mineworkers as Labour Parliamentary candidate for Chesterfield, Mr. ERIC VARLEY (29) has already gained 181 of the 340 votes of the local party selection committee and is almost assured of securing the candidacy. Sir George Benson, present Labour MP for Chesterfield, is retiring at the end of the present session. He had a majority of 13,000 at the last election.

Col. LYNDALL F. URWICK, chairman of Urwick Orr & Partners, Limited, management consultants, of London, S.W.1, is to receive the Henry Laurence Gantt Medal, given annually by the American Management Association and the American Society of Mechanical Engineers. This is the first time that the medal, which honours "distinguished achievement in management as a service to the community," has been awarded outside the US.

Deputy chairman and former managing director of BTR Industries, Limited, thermoplastics and rubber manufacturers, Mr. P. W. HOWARD has retired on reaching the age of 70. He has served with the company for 35 years. A past-president of the Federation of British Rubber and Allied Manufacturers, and since 1957 president of the Rubber and Plastics Research Association, he served as a member of the Mining Advisory Committee appointed by the Ministry of Supply when the National Coal Board was established.

Mr. J. M. WILLIS, who retired from the post of No. 1 Area mechanical engineer, Durham Divisional Coal Board, at the end of August, has been 46 years in the industry. He served his apprenticeship with Lambton, Hetton & Joicey Collieries, Limited, at the Lambton engineworks and was later appointed engineer at the Lambton "D" pit. In 1935 he was appointed assistant chief engineer to the company. At vesting date he became group engineer in No. 2 Area, Durham Division, and moved to No. 1 Area as assistant chief engineer in 1952.

RTB Works Appointments at Ebbw Vale

NEW appointments have been made at the Ebbw Vale works of Richard Thomas & Baldwins, Limited. Mr. A. H. Pople, deputy combustion engineer, has been appointed manager, fuel control department, and Mr. E. H. Jones, combustion engineer, becomes section consultant combustion engineer. Mr. S. I. Williams, senior electrical engineer at the Spencer Works, has been appointed deputy chief electrical engineer, Ebbw Vale.

Formerly with the Hunslet Engine Company, Limited, Mr. S. Taylor has been appointed locomotive superintendent, and Mr. R. James, general foreman, slab yard, becomes slab yard superintendent. Mr. G. Cacanas, a graduate trainee, has been appointed technical assistant to the manager, hot strip mill, and Mr. A. Bruce, also a gradute trainee, becomes assistant roll shop superintendent.

MACHINES WIN MORE COAL

Productivity Rise in East Midlands NCB

REPORTING increased efficiency in the East Midlands Division of the NCB, Mr. W. L. Miron, chairman, says that saleable output of coal to the end of June this year was 22,385,151 tons —25 per cent. of the national total. Over 67 per cent. of this was won by the 353 power loading machines at work in the division, compared with 59 per cent. last year, and output per manshift for all employed averaged 43 cwt., compared with 42 cwt. last year, when the national average was 27.9 cwt. This had been achieved despite the loss of over 1,200 men in the division during the half year.

Mr. Miron, in an article in the Sheffield Telegraph, says that the health of the East Midlands Division is good and its prospects excellent. Coal and coke stocks built up over the past three years are now steadily falling, the demand for coal for electricity generation is rising rapidly, and the division's output will be in the region of 43,500,000 tons this year.

MR. W. L. MIRON

In the first half of this year, disposals to power stations from the division rose by 1,500,000 tons to 8,750,000 tons and new and established power stations in the East Midlands and elsewhere are expected substantially to increase their demands for coal. Coal stocks, which critics once condemned as "unsaleable," were now being forwarded to power stations and other industrial consumers, and nearly 3,000,000 tons of stocked coal has been sold during the past year, while coke stocks are down by over 100,000 tons.

Lurgi Developments

The chairman says that the division hopes to strengthen its traditional links with the gas industry through the development of a giant Lurgi plant for the total gasification of coal. Four sites in the East Midlands—two or them in Nottinghamshire—are being considered for this project, and designs, costs, and layouts are expected to be available for study towards the end of this year. Active consideration is also being given to the possible siting of a char briquetting plant in the division to produce the new type of smokeless fuel developed by the National Coal Board. The output envisaged for this plant is about 1,000,000 tons a year.

There is a growing demand for domestic central heating, says Mr. Miron, and hundreds of householders are taking advantage of the NCB Housewarming Plan. The result is an increasing demand for Sunbrite, the quality hard coke, and the division's modern Avenue carbonization plant at Wingerworth, near Chesterfield, is well-equipped to increase output of this fuel.

Results of the sales campaign launched by the NCB in the spring, to which the division is giving maximum support, have been gratifying. He mentions that on one new Nottinghamshire housing estate alone, 10 out of the first 14 houses sold were being equipped with solid fuel central heating. "This is further evidence that once people are given the facts about solid fuel, it is an attractive selling proposition. People investing hard-earned cash in new homes recognize that coal gives value for money."

Referring to the manpower shortage, Mr. Miron says that while the board is finding it hard to replace the hundreds of skilled men who reach retiring age each year, it is not pessimistic. During the past year a number of skilled mineworkers have moved from some of the oldest Derbyshire collieries to Bevercotes, one of the two large new mines being developed in Nottinghamshire. The colliery, which will eventually employ about 1,800 men, has begun production on its first two coal faces, and underground development is being continued. Already 270 houses have been provided in the neighbourhood of the new colliery, and the Coal Industry Housing Association expects to provide another 830.

Production at Cotgrave Colliery, the other new Nottinghamshire mine, is expected to begin in about two years and will employ about 2,000 men when in full production. The provision of 1,300 houses is proposed.

Fife Seeks Smokeless Fuel Plant

EFFORTS are being made to have Scotland's first smokeless fuel plant established at Buckhaven and Methil, Fife. The National Coal Board is planning to establish a smokeless fuel plant in Scotland by 1965, and advances in smokeless fuel research by Henry Balfour & Company, Limited, at nearby Leven, have prompted the town clerk to press the burgh's claims in a letter to Mr. R. W. Parker, chairman of the Scottish Division of the NCB.

Dr. E. A. C. Chamberlain, chief scientist of the Scottish Division said: "The matter is still at the experimental stage. The board hopes to come to some sort of decision before the end of the year."

MILES DRUCE & COMPANY, LIMITED—Mr. W. M. Martin has resigned from the board on grounds of health.

Mr. Gerard Young is New Master Cutler

CHAIRMAN of the Tempered Group, Limited, Sheffield, and of the manufacturing subsidiaries, Tempered Spring Company, Limited, and Tempered Rubber Components, Limited, Mr. Gerard Young has been elected the 338th Master Cutler and will be installed on October 3. Mr. Young, who is 51, succeeds as Master Cutler Mr. C. H. T. Williams, chairman of Park Gate Iron & Steel Company, Limited, and a director of a number of other steel companies.

Mr. Young, whose maternal grandfather was Sir John Aspinall, the celebrated railway engineer, began work as an apprentice to Sir Nigel Gresley, designer of the Pacific-type locomotives, at the LNER plant works at Doncaster. The apprenticeship lasted three years, after which he joined his father's firm in 1930 as a management trainee at a wage of £1 a week. The firm then employed 100. In 1936 he became a director, in 1942 managing director, and in 1954—on his father's death—he became chairman.

Since Mr. Young's father, the late Mr. Smelter J. Young, bought Tempered Springs "with 10 men and lads in the works and a collie dog in the office," the company has shown remarkable growth. Tempered Group, Limited, was formed as the parent company, and from making springs originally for railway carriage windows, Tempered Springs has branched out into springs for almost every section of engineering, and into world markets. Tempered Rubber Components expresses the growing association of rubber with springs, and by way of diversification the group has also bought two old-established tool firms, Alfred Beckett & Sons, Limited, and Henry Russell & Company, Limited.

Outside of business, Mr. Young has done notable work for Sheffield University. He is senior pro-Chancellor, and chairman of the building committee which guides the development plans by which the university is spending £1,000,000 on new buildings. In post-war years he has been a member of the board of governors of the United Sheffield Hospitals, and chairman of its finance committee.

As a Roman Catholic, Mr. Young will not attend the traditional installation service in Sheffield Cathedral. His place will be taken by the new senior warden, Mr. S. M. de Bartolomé, of Spear & Jackson, Limited. The new junior warden is Mr. Howard Poulsom Forder, a director of the United Steel Companies, Limited, and director and general manager of its subsidiary, Samuel Fox & Company, Limited, Stocksbridge.

Plessey Acquires Fuel Pump Makers

ENTIRE share capital of SPE Company, Limited, Slough, has been acquired from the Booker Group by Plessey Company, Limited, the manufacturing electrical engineers. The price paid was about £50,000. SPE company, which manufactures a range of aircraft fuel pumps and associated equipment, is a subsidiary of Pulsometer Engineering, Limited, recently acquired by the Booker Group in conjunction with G. & J. Weir Holdings, Limited.

SPE will continue to operate as an autonomous company within the Plessey group, and no immediate changes are intended either in product or marketing policy.

Law Cases

MINING REGULATIONS BREACHED

AT Ayr Sheriff Court, Alex McLarty (52), shotfirer, admitted three breaches of mining regulations at Pennyvenie Colliery, Dalmellington (Ayrshire). He was charged with failing to record a misfired shot in the book provided for the purpose; discharging a shot within 90 ft. of another shot; and inserting more than one detonator in a shot-hole.

An agent said McLarty had been down-graded to a £12-a-week job as a salvage worker, and had lost £720 superannuation and a £4 pension. McLarty was admonished on the charge of using more than one detonator, and on the other two charges fined a total of £10.

SHOTFIRER PLEADS GUILTY

HAVING pleaded guilty to omitting to report a misfire in the daily record of shots at Pochin Colliery, Tredegar, South Wales, Elwyn Charles Holley was fined £2 with £3 3s. costs at Tredegar Magistrates' Court. Holley also admitted failing to report the misfire to a senior official on duty and failing to ensure that the affected place was safe for working.

It was stated that the defendant had fired more than 40 shots a day during his time at the colliery.

CHEMICAL TRAPS SCRAP THIEVES

USE of Rhodermine B led to the arrest and conviction of two men for thefts of scrap metal from Kayser, Ellison & Company, Limited, steelmakers, of Sheffield. Because of previous losses of metal, stocks were sprayed with the chemical which is fluorescent under ultra-violet light and indications of contact with the chemical were shown up on the two men.

Both men were committed in custody to the next Quarter Sessions.

FOR A BREACH of the factory regulations in May when a maintenance fitter was crushed to death by an overhead crane, Dartmouth Auto Castings, Limited, Smethwick (Staffs), was fined £40 with 10s. costs at West Bromwich. It was submitted that the firm did not take effective measures to warn the fitter of the crane's approach.

BISRA Computer Research Section Renamed

IN recognition of the steady growth in the scope of its activities over recent years, the computer applications section of the operational research department of the British Iron and Steel Research Association has now been renamed the systems evaluation section. The duties of the new section, which will be headed by Mr. D. H. Kelley, will be to carry out operational research investigations into the automation of large-scale systems.

The immediate programme will be to study the automatic production planning and scheduling of various kinds of steelworks, and to investigate the information requirements of steelworks management. The services to members which were previously supplied by the computer applications section and which included operation of the association's Pegasus computer, advice on the uses of digital computers in steelworks offices and the training of Pegasus programmers, will be continued unchanged.

ISI Special Meeting in the USA and Canada

UNITED STATES STEEL CORPORATION

During the forthcoming special meeting of the Iron and Steel Institute in America and Canada members will visit the Fairless Works and the Homestead Works and the Monroeville Research Centre of the United States Steel Corporation. This concern, the largest steel producer in America, has an annual steel production of about 30,000,000 short tons, equal to 28 per cent. of the production of the United States and more than the total annual production of the United Kingdom.

MOLTEN IRON BEING TAPPED FROM ONE OF THREE BLAST FURNACES AT THE FAIRLESS WORKS OF THE UNITED STATES STEEL CORPORATION.

THE United States Steel Corporation may be said to be the creation of Elbert H. Gary, better known as Judge Gary, who, towards the end of the last century, took part in the organization of a western steel producer, the Federal Steel Company, and foresaw that America's expanding economy would call for the efficient and economical manufacture of steel in large tonnages. He referred to his conception as a " rounded proposition," later to be called an " integrated " operation. His dream of fully integrated steel operations had to await fulfilment until Andrew Carnegie decided to sell all of his holdings in the Carnegie Company.

The Carnegie interests and the Federal Steel Company constituted the nucleus of the United States Steel Corporation. They and their subsidiaries brought into the new corporation iron and coal-mining properties, steamship facilities, railways, and steel producing, finishing, and fabricating units. The eight other original members were:—American Bridge Company; American Sheet Steel Company; American Steel & Wire Company; American Steel Hoop Company; American Tin Plate Company; Lake Superior Consolidated Iron Mines; National Steel Company, and National Tube Company. Over the years, the properties of most of the originating companies have ceased to be identified with their original names, in keeping with the evolution in United States Steel's operations and progressive changes in the corporate structure.

Additions to the Family

United States Steel has been enlarged from time to time since 1901 by the addition of new members. In recent years, its corporate structure has been simplified, the parent corporation itself becoming primarily an operating company, with a number of subsidiaries becoming general operating divisions.

The divisions are the American Bridge Division, Pittsburgh, Pa.; American Steel & Wire Division, Cleveland, Ohio; Columbia-Geneva Steel Division, San Francisco, California; Consolidated Western Steel Division, Los Angeles, Calif.; Michigan Lime-

BLAST-FURNACE HOT METAL BEING POURED INTO ONE OF NINE OPEN-HEARTH FURNACES AT THE FAIRLESS WORKS. THE LADLE BEING EMPTIED IS SUPPORTED BY A 200-TON OVERHEAD CRANE.

stone Division, Detroit, Mich.; National Tube Division, Pittsburgh; Oil Well Supply Division, Dallas, Texas; Oliver Iron Mining Division, Duluth, Minn.; Pittsburgh Steamship Division, Cleveland; Tennessee Coal & Iron Division, Fairfield, Ala.; United States Steel Homes Division, Pittsburgh; United States Steel Products Division, New York; United States Steel Supply Division, Chicago, Illinois; and Universal Atlas Cement Division, New York, N.Y.

The principal subsidiaries are Bessemer & Lake Erie Railroad Company, Pittsburgh; Birmingham Southern Railroad Company, Fairfield, Ala.; Carnegie Natural Gas Company, Pittsburgh; Duluth, Missabe & Iron Range Railway Company, Duluth, Minn.; Elgin, Joliet & Eastern Railway Company, Chicago; Newburgh & South Shore Railway Company, Pittsburgh; Orinoco Mining Company, Caracas, Venezuela; Pittsburgh & Conneaut Dock Company, Conneaut, Ohio; Quebec Cartier Mining Company, Quebec, Canada; Union Railroad Company, Pittsburgh; and the United States Steel Export Company, New York.

US Steel owes much to good leadership throughout its history. Its first president was Charles M. Schwab. Judge Gary guided its destinies for 26 years and after his death in August, 1927, the guiding hand was that of Myron C. Taylor until 1938, a period during which the American economy shifted from emphasis on capital goods to consumer goods, requiring the installation in the steel industry of continuous hot-strip and cold-reduction mills for the mass production of sheets.

Since 1938, the chairmen of the board of directors have been the late Edward R. Stettinius, Jr. (1938-40); Irving S. Olds (1940-52); Benjamin F. Fairless (1952-55); and, since 1955, Roger M. Blough.

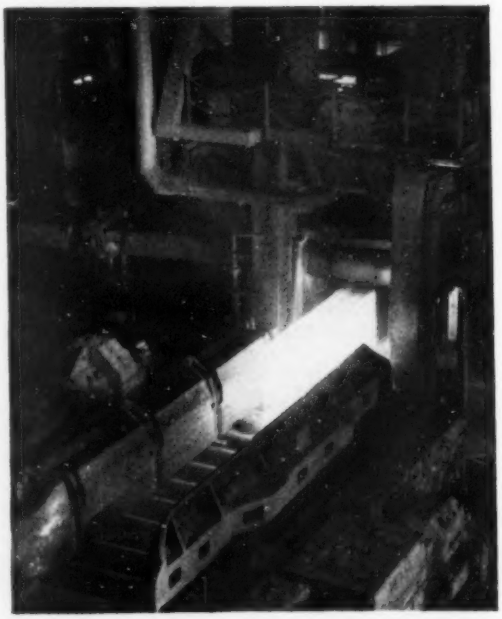
Recent presidents have been: Benjamin F. Fairless (1938-53); Clifford F. Hood (1953-59); the late Walter F. Munford (May-September, 1959); and, since November, 1959, Leslie B. Worthington.

Range of Activities

US Steel mines substantially all of its iron ore and mines and quarries most of its bituminous coal and limestone. It operates a number of common-carrier railways which connect US Steel properties with main trunk transport facilities, and, as the major source of the company's iron ore is in the Lake Superior region, it operates a fleet of cargo vessels and docks on the Great Lakes as well as tug boats, vessels, and barges on other inland waterways.

Fairless Works

At the Fairless Works, US Steel's first integrated steel plant in the east, the company has the most modern steel plant in America. It is built on a 3,900-acre site in Bucks County, Pennsylvania, on a bend in the Delaware river about 5 miles below Trenton, N.J., and 30 miles above Philadelphia. The Delaware river is an important factor in the



THE 45-IN. UNIVERSAL SLABBING MILL AT THE FAIRLESS WORKS.

reception of raw materials and despatch of finished products.

The coal storage area, served by a conveyor system, has a capacity of about 400,000 tons of coal. The ore storage yard can take 750,000 tons.

Coke Ovens and Blast Furnaces

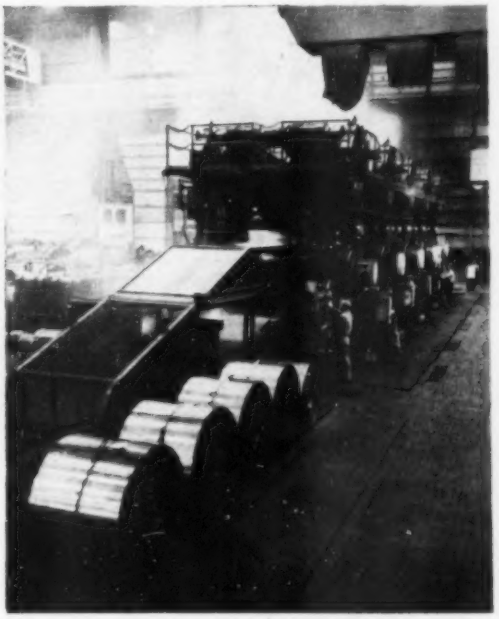
There are two batteries of 87 by-product coke ovens each. They are of low differential, four-divided underjet design. The normal oven charge is 16 tons, and normal coking time is 17.4 hr., giving a total of 240 ovens per day, equivalent to a coking capacity of 3,800 tons of coal per day. By-product recovery is along conventional lines. Surplus gas is used as a metallurgical fuel.

There are two blast furnaces, each rated at 567,000 tons per year. They are identical in design and dimensions; hearth diameter 28 ft., bosh diameter 31 ft. 3 in., height 105 ft. (from iron notch to slag ring), working volume 47,345 cu. ft. (from tuyeres to stockline). The furnaces are tapped into 200-ton mixer type ladles. Basic iron is produced, principally for direct use in the open-hearth furnaces, but a double-strand pig-casting machine is available. An addition to the Fairless Works made in recent years is a large modern sinter plant. Sinter is becoming an increasing proportion of the blast-furnace burden.

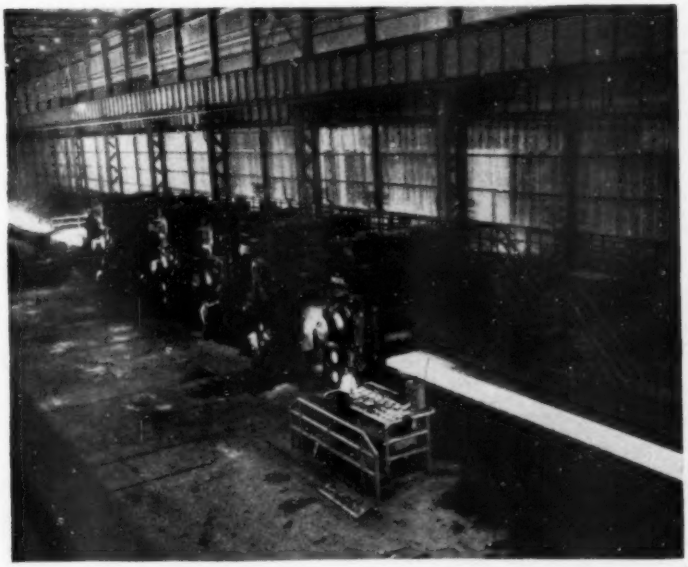
Steelmaking

All steelmaking at Fairless is by the open-hearth process. The open-hearth plant of nine 290-ton furnaces is located between the coke plant and blast-furnace areas on one side and the rolling mills on the other, and is laid out diagonally between these areas, simplifying track connections. The furnaces are spaced on 117-ft. centres and are 94 ft. 3½ in. overall length inside the steelwork. Hearth dimensions at sill level are 60 ft. by 18 ft. 6 in., giving a hearth area of 1,110 sq. ft. Bottom thickness is 39½ in. at the centre, comprised of 1 in. of insulating concrete, 18 in. of chrome brick, 9 in. of magnesite brick, and 11½ in. of rammed material. The furnaces are fired with fuel oil or tar or a combination of these through water-cooled burners at the furnace ends.

Very few heats are now made without the intense use of oxygen. The practice is to charge the furnace in the conventional manner with limestone, ore, scrap, and cold pig when used (normally hot metal represents 70 to 80 per cent. of the charge). The oxygen lances are inserted to the slag level after the addition of hot metal to the furnace and are kept in the furnace until tapping. A constant oxygen injection is maintained throughout the heat.



EXIT END OF THE 5-STAND COLD-REDUCTION MILL AT THE FAIRLESS WORKS.



THE SIX FINISHING STANDS OF THE 80-IN. HOT-STRIP MILL AT THE FAIRLESS WORKS.

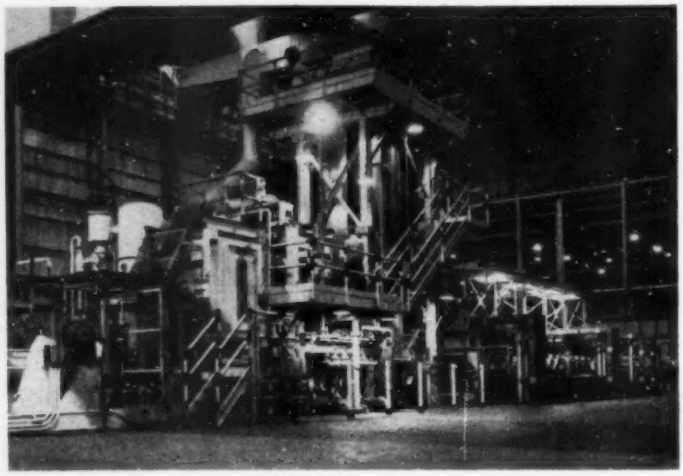
The flush is rapid, averaging 60 to 90 min. for a 345-ton to 400-ton heat. Two hours after the addition of hot metal the bath is tested for carbon and temperature. From this point a schedule for both carbon and temperature determination is set and maintained until tap. During the working period the bath temperature is controlled by increasing or decreasing fuel, or by the addition of lime or feed ore, depending on bath temperature conditions.

Slabbing and Rolling Mills

The approach table to the 45-in. slabbing mill is 51 ft. 9 in. long, and includes a motor-operated overhead type ingot turnaround with a 50-ton scale and weight recorder. The mill is of the universal type, with vertical rolls integral with the main mill housing. The horizontal rolls are 45 in. dia. by 96 in. body length. Vertical rolls, 37 in. dia. by 96 in. body length, are located 8 ft. 3 in. beyond the horizontal rolls.

Steel leaving the slabbing mill may follow any one of three routes. Slabs intended for the hot-strip mill may be moved to the left over a 16 by 115 ft. transfer leading to the slab furnace charging table in the slab yard, or they may proceed straight ahead to the hot-strip mill for direct rolling. Slabs or blooms to be further rolled in the intermediate mill and billet mills are carried to the right over a 234 by 22-ft. rope type transfer to the approach table of the 40-in. mill.

The 40-in mill is a high-lift, two-high reversing blooming mill, with rolls of 96 in. body length. Steel leaving the 40-in. mill proceeds over a table containing a gas scarfing machine equipped with a fume removal system and electrostatic precipitator, and a down-cut shear. If the steel from mill is to be despatched, it is taken over a 102-ft. rope driven, ducking-dog type transfer to a parallel table about 34 ft. away, where the steel is moved back in the reverse direction, through a down-and-up cut shear and over two hot beds to screw elevated pilers. If the steel is to be rolled down further, it proceeds straight ahead to a six-stand 30-in. billet mill.



ELECTROLYTIC TINNING LINE AT THE FAIRLESS WORKS.

Steel leaving the 30-in. mill is taken over a rope-driven transfer to the parallel table previously mentioned. If it is ready for despatch, it is moved back in the reverse direction through the shear and over the two hot beds. If the steel is to be further reduced, it is taken ahead to a swinging crop shear and on to the four-stand, 21-in. mill, generally similar to the 30-in. mill. The 21-in. mill stands are alternately vertical and horizontal, spaced on 8 ft. 6 in. centres.

Billets leaving the 21-in. mill pass through an electrically operated flying shear placed 20 ft. beyond the last mill stand, over a skewed roller gathering table, and on to four (40 ft. by 137 ft. 6 in.) rope driven, ducking-dog type hot beds.

The 40-in. mill receives blooms 22 in. by 16 in. or smaller from the 45-in. mill, and rolls them down to minimum 9-in. by 9-in. blooms or 11-in. by 7-in. slabs. The 30-in. mill takes 9-in. by 9-in. blooms or slabs 12 to 18 in. by 5½ to 7 in., and produces billets 4 in.

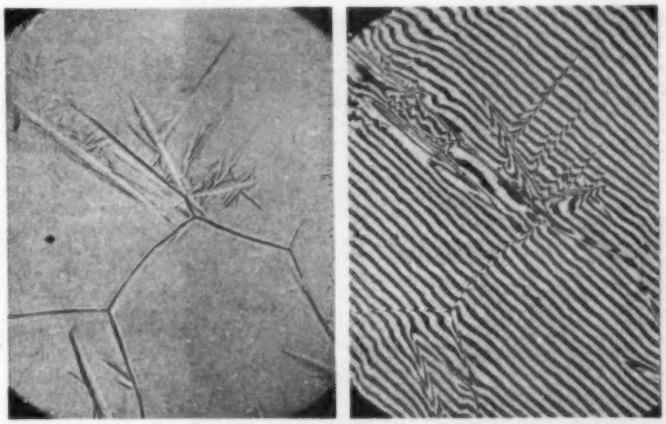
UNITED STATES STEEL'S RESEARCH CENTRE AT MONROEVILLE, PA. THE EDGAR C. BAIN FUNDAMENTAL LABORATORY IS ON THE LEFT, THE MAIN BUILDING OF THE APPLIED RESEARCH GROUP IN THE CENTRE, AND THE RECENTLY COMPLETED ELECTROMECHANICAL ENGINEERING BUILDING ON THE RIGHT.

or 5¾ in. square, rounds 4½ to 5¾ in. dia., or slabs 10 to 16 in. wide and 3½ to 4 in. thick. The 21-in. mill takes 4-in., 4½-in., or 5¾-in. square or round billets, or 8-in. by 3½-in. slabs and reduces them to 2, 2½, 3, or 4-in. squares, 3 to 4½-in. rounds, or slabs 8 to 10 in. wide by 2½ in. thick.

The bar mill is a 10-in. continuous unit. It takes 2 to 4-in. square billets up to 40 ft. long from the billet mill, and reduces them to rounds ⅜ to 2 in., squares 11/32 to 1 7/16 in., or hexagons ⅜ to 1⅞ in., angles 1 by 1 in. to 2½ by 2½ in., channels ¾ to 2 in., or flats ⅞ to 5 in. wide.

The 80-in. hot-strip mill, which went into operation in July, 1953, is designed to reduce slabs 16 to 72 in. wide, 4 to 8 in. thick, and 7 ft. 6 in. to 20 ft. long down to strips; 18 gauge (0.048 in.) up to a maximum width of 49 in., 16 gauge (0.060 in.) up to 61 in. maximum, and 14 gauge (0.075 in.) up to 74 in. maximum width. All widths can be rolled as heavy as ¼ in. thick and this thickness can be coiled.

The sheet and tin mill, with 28 acres of floor space under roof, contains complete facilities for the finishing of hot-rolled product and the production of cold-rolled sheet and tinplate.



LEFT: RELIEF EFFECTS ON A STEEL SURFACE PRODUCED BY PARTIAL TRANSFORMATION DURING COOLING FROM A HIGH TEMPERATURE. RIGHT: LIGHT INTERFERENCE EFFECTS ARE USED TO MEASURE THE MAGNITUDE OF SURFACE RELIEF IN THE PHOTOMICROGRAPH AT THE LEFT.
(Original magnification 800×; reduced to about 230× in reproduction.)

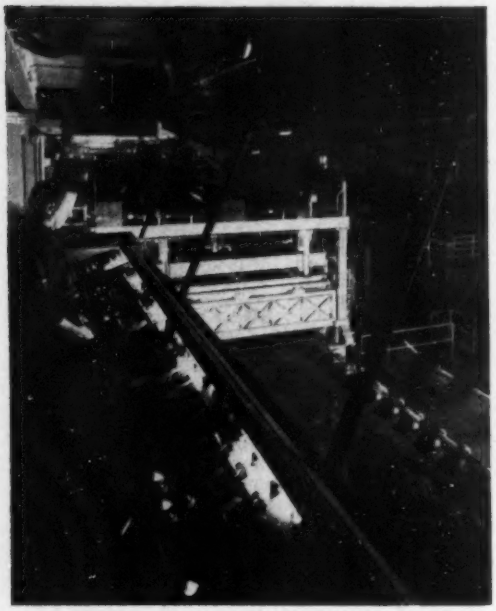
MODEL TO DEMONSTRATE HOW STEEL I-BEAMS CAN BE MEASURED BEFORE SAWING TO ELIMINATE WASTE.

Material to be despatched without cold reduction is customarily put through a very unusual 72-in. combination temper pass, side trimming, slitting, recoiling, and shearing line. Over 380 ft. in length, this line starts with a processing scalebreaker containing two sets of flexing rolls instead of one set, followed by an up-cut shear, pinch rolls, and side trimmer with scrap chopper. When desired a slitting unit can be put in place of the side trimmer. Next is a two-high 32-in. by 80-in. temper mill with a tension bridle on each side. This mill flattens and tempers the material, eliminating an additional handling.

Next follows a tension reel for coiled product. Material to be cut to length passes over this coiler on a conveyor and goes through a flying shear, a backed-up roller leveller, and a sheet classifier. This last unit, under "electric eye" control, diverts sub-quality product into a reject piler.

The unit will produce edge-trimmed strip of 18-72 in. width, and will handle thicknesses of 0.06 to 0.25 in. (0.125 in. maximum thickness for slitting). Cut-to-length product may range from 48 to 288 in. The line operates at speeds of 80/400 ft./min.

Coils to be pickled are taken from the raw coil storage building to a continuous 80-in. pickling line 790 ft. long. The first unit in the line is a processing scalebreaker similar to that in the hot-rolled finishing line. Next are two crop shears instead of the usual one, the second being installed so that the knives may be kept in top condition for cropping ends to be welded. After the conventional welder, flash trimmer, stitcher, pinch rolls, and looping pit comes the unusual installation of a two-high, 32-in. by 80-in. temper mill



VIEW FROM THE OPERATOR'S PULPIT OF A HEAT-TREATED ARMOUR PLATE LEAVING THE TEMPERING FURNACE AND MOVING TOWARDS THE WATER QUENCH OF THE NEW CONTINUOUS PLATE HEAT-TREATING LINE INSTALLED AT UNITED STATES STEEL'S HOMESTEAD DISTRICT WORKS.

similar to that used on the 72-in. hot-rolled finishing line. The mill effects a reduction of 2 to 5 per cent. on the strip and at the same time cracks the hot mill scale so as to improve pickling action. It also improves the shape of the material for subsequent cold rolling.

Next in line are another looping pit and pinch rolls, followed by the pickling tank. Another tank contains cold-water sprays and a hot-water rinse, and is followed by a dryer and a looping pit.

Pickled coils are carried on a conveyor to a storage area serving the cold-reduction mills. Cold-reduced sheets are rolled on a four-stand, 80-in. mill designed for a top delivery speed of 3,110 ft./min.

Tinplate is rolled on a five-stand cold reduction mill. Annealing facilities include 11 portable cover-type furnaces and one 48-in. continuous annealing line.

The electrolytic tinning line is 312 ft. long overall, and can produce coatings ranging from 0.1 to 1.0 lb. per base box. It has a top speed of 1,250 ft./min. For heavier coatings, cut-to-length material is put through five hot-dip lines, designed for line assorting.

The National Tube plant at the Fairless Works consists primarily of a skelp mill, two butt-welded tube mills, and auxiliary finishing equipment, providing facilities for the production of ½ to 4 in. dia. butt-weld pipe.

Research

Located in Monroeville, Pennsylvania, about 15 miles east of Pittsburgh, US Steel's research centre is situated on a partly-wooded 142-acre hilltop tract. Here, 1,200 scientists and research personnel engage in nearly 600 different projects ranging from broad fundamental studies of the properties of metals and raw materials to applied research and development of new processes and products.

Perhaps the most dramatic example of US Steel's concern with automatic control research is the corporation's new experimental blast furnace. The only one of its kind in the world, it will soon be revealing to the corporation's research team the chemical mysteries and reactions of the blast-furnace process.

To probe the universe, US Steel has developed two high-strength, lightweight steels—USS STRUX with a yield strength of 250,000 lb./sq. in. for aircraft and rockets and Airsteel X-200, an ultra-high-strength at high-temperature alloy steel for missiles. Other research efforts include an alloy steel with a yield strength of 100,000 lb./sq. in. for such applications as bridges, TV towers, tall buildings, and earth-moving equipment; high-strength magnetic steels; vinyl-coated steel sheets; free-machining steels for screws and fittings; and fine wires with tensile strengths in excess of 600,000 lb./sq. in.

Homestead District Works

The roots of the Homestead Works dates back to 1879, when Andrew Kloman and the Pittsburgh Bessemer Steel Company built converter plant and a blooming mill at Pittsburgh. It became part of the newly formed United States Steel Corporation in 1901. With its present annual capacity of approximately 4,500,000 short tons of steel ingots, the Homestead Works is the largest United States Steel Corporation plant in eastern United States. Within its 450 buildings and on its 430 acres, about 13,000 men and women are employed.

The blast-furnace department consists of six blast furnaces, ranging in rated capacity from 976 tons to 1,447 tons, with a total combined output of 6,700 tons daily. The molten pig-iron is charged into 25 basic open-hearth furnaces ranging in capacity from 145 tons to 300 tons.

There are three plate mills at Homestead, and a feature of particular interest in plate production is the heat-treating equipment. The installation of a continuous quenching and tempering line resulted in good customer response and later a second similar line was installed.

The heat-treating and forge department at Homestead is the United States Steel Corporation's only producer of commercial forgings, including such specialties as rolls and sleeves.

• *Acknowledgment is made to the United States Steel Corporation and the Iron and Steel Engineer for providing information and illustrations.*

Self-advancing Supports at Cortonwood Colliery

Application with Trepanner and Shearer Loaders

by **E. H. LUNNESS***

A description is given in this paper of Seaman Gullick self-advancing roof supports and their application at Cortonwood Colliery, where they are being used to work the Silkstone Seam in conjunction with an Anderton Disc shearer and the Haigh Moor Seam with an AB trepanner. Reference is made to the method of installation and the results obtained from both faces are analysed. The paper was presented to the Yorkshire Branch of the National Association of Colliery Managers on February 14, 1961.

SITUATED midway between Barnsley and Rotherham, Cortonwood Colliery, in the No. 3 Area of the North-Eastern Divisional Coal Board, produced 583,420 tons of coal during 1960. Of this 197,865 tons was produced from faces supported by self-advancing chocks at a face o.m.s. of 195 cwt.

The seams worked at Cortonwood are the Silkstone and the Haigh Moor. One chock installation is in operation in each of the two seams.

All chock units are so designed that they maintain a minimum distance between the conveyor and the front of the chock of 1 ft. 6 in. to permit access along the face. The chock unit, shown in Fig. 1, consists of four hydraulic legs located in a fabric frame 2 ft. 3 in. square at the base giving a floor area of 5 sq. ft. Each leg is located in a collar at the base of the frame, and is held at right angles to this base by a large rubber bush, located in the top plate of the frame. The rubber bush has two functions; it allows the chock as a unit to yield with any lateral movement without mechanical damage, and it ensures that the hydraulic leg is set at right angles to the baseplate every time the chock is set, thus the support is always set normal to the roof and floor. This frame is fitted by bolts and dowels to a substantial baseplate which has guides for attaching the ram.

* Manager, Cortonwood Colliery, No. 3 Area, North-Eastern Divisional Coal Board.

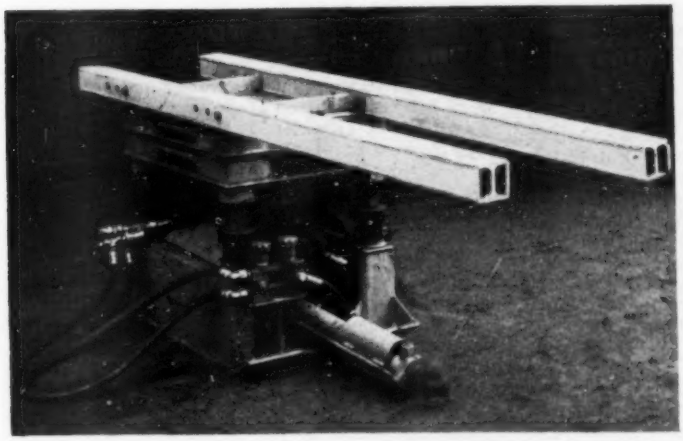


FIG. 1.—THE SEAMAN GULLICK CHOCK FITTED WITH RIGID BARS.

All the rams are double acting to push the conveyor forward and advance the chock. On top of the hydraulic legs a specially designed box type canopy is fitted which has longitudinal recesses to carry two cantilever bars; these are situated directly over the legs so that the roof load is taken directly from the roof bars to the hydraulic legs. The setting load of the chock is 11.2 tons and the yield load 120 tons. The valves fitted to the chock, when operated, lift or lower the back and front legs in pairs, push over the conveyor, and advance the chock.

The standard ram is double acting with a stroke of 2 ft. 3 in. It is attached to the baseplate by a clevis on the rear-end block. A specially designed

pin allows freedom of movement of the ram and also quick adjustment to any of the four positions on the base. If the ram had been located to the panzer conveyor and to the chock without this freedom of movement, under certain undulations bent piston rods and broken glands would undoubtedly result. A thrust of 6,250 lb. is exerted by the ram to push over the conveyor and 4,250 lb. to advance the chocks.

Pressurized fluid is pumped from the gate along a wire braided ¾-in. dia. hose capable of withstanding a maximum working pressure of 3,250 lb./sq. in. At each chock is a T-piece to tap off to each valve. Similarly a return line is used to permit the exhaust liquid to return to the reservoir tank attached to the pump. This return line is of 1 in. dia. and will withstand a maximum working pressure of 1,000 lb./sq. in.

Two pumps are necessary and are usually installed one in each gate at either end of the face so eliminating the possibility of pressure drop. The pumps are of the horizontal treble-ram type, powered by a 15-h.p. motor and are capable of delivering 6 gal./min. at 1,000 lb./sq. in. It is important to ensure that the water used will form a suitable emulsion, this being obtained by adding 2 per cent. soluble oil to the water in the closed circuit. Two 100-gal. tanks are housed with the pumps in each gate. An isolating valve is fitted along the face, the position of which depends upon the inclination of the seam. It is usually sited so that the pressure required to pump the return fluid to the tank is the same for each pump, the pump at the dip end of the face having more chocks connected to it than the pump at the rise end.

The bars first used in conjunction with the chocks were made in the Area workshops and consisted of 3½-in. by 3½-in. heavy-section girders 7 ft. 6 in. long with a strip of ⅜-in. flat steel welded between the flanges on each side of the girder for the full length. These bars were found to have several undesirable characteristics; they were not easily transported to and along the face, they were difficult to set on the chock and change due to their length and weight, and they were too rigid, it being impossible to cater for slight undulations in the roof.

Trials with several types of bar were made and it was found that link bars would provide the characteristics required. All chocks installed since August, 1959, have been fitted with Vanwersch 52/96 link bars in two sections linked to give a total length of 7 ft. 6 in. The section over the chock is a metre in length and is fastened to the chock by two bolts, the male end of this bar extending 12 in. behind the chock into the waste to prevent the roof from breaking down and damaging the hoses. A short length of bar, with the female end cut off, is linked on to the section fastened to the chock.

The chocks not only provide a support system, but also push over the convevor. The working pressure of the pump is 1,000 lb./sq. in., and the chock is pre-loaded to 11.2 tons. As the roof load is taken up, the chock yields only ¼ to ½ in. to reach its maximum load of 120 tons, and thereafter will yield. Chocks should be designed so that a minimum hydraulic yield of 6 in. is always available to cater for small undulations in the roof or floor and for convergence.

Installing the Supports Units

Chocks have been installed on faces at Cortonwood Colliery when the following conditions prevailed:—

(*a*) The face has already been working and supported by the goalpost system. In this case six chocks were installed on each nightshift with the exception of the last 11. These were at the tailgate end of the face, extending into the packhole and were installed in one shift.

(*b*) The face already working and supported by the goalpost system and prefabricated chocks. In this case the change in support system was carried out during a holiday week, 154 chocks being installed in nine working shifts by 172 face manshifts. The best performance during the period was when 22 chocks were installed. The total installation cost including transporting the equipment from the surface was £997.

(*c*) Transporting the whole chocking system from a face that had finished to one developed and supported by wooden props and bars. This was the changeover from 7s south to 9s south district in the Silkstone Seam. As 9s south was a longer face than its predecessor, 35 new chocks had been installed before the changeover took place. The remaining 101 chocks were transferred in four days working on all three shifts. The actual cost of installing the chocks on 9s south face, not including transport, was £510 and the manshifts employed 210.

(*d*) West rise 6s and 7s faces had both been developed by hand until 80 yd. of face at right angles to the gates was opened out. This length of face was then equipped before its predecessor reached the boundary. Stripping with the trepanner then commenced and the panzer conveyor and chock installation extended as the face advanced and increased in length.

In all the cases mentioned the method of installing the chocks is basically the same. The face is opened out a minimum width of 12 ft. and the panzer conveyor installed, a minimum distance of 15 in. being maintained at the face side of the conveyor. On a face that is working, the conveyor is only rammed over sufficient to allow 15 in. at its face side. Spill plates are not attached, or if they have been, they are removed before the installation commences. Signals are erected and a code of signals provided to the three teams of men.

On arrival at the colliery, the chocks are loaded on to flat-bottom trams with wooden boards placed between the chock and flat bottom to prevent slip. Sets of six chocks, with the canopies in position are sent into the pit. Accompanying each set is a tram with 12 sets of link bars and six rams. All the hoses are transported to the face in a tub with the first set. The sets are hauled by endless-rope haulage to within 20 yd. of the coal face in the tailgate. From the end of the rope haulage the

tub road is layed so that the top of the flat-bottom tram is slightly higher than the top of the panzer conveyor.

When the chocks arrive at the face the hoses are fitted and the flat-bottom vehicles trammed to the edge of the panzer conveyor. Here the canopy is taken off and layed on the conveyor in the well formed by two flights, with the face side projecting over the conveyor. The rope from the stable cutter is attached to the chock, the flat-bottom tram and cutter securely anchored, and the chock pulled onto the conveyor. The chock also fits between the flights on the conveyor. Two sets of link bars and a ram are now placed on the conveyor behind the chock. The conveyor chain is moved forward 2 yd. and the process repeated until all six chocks complete with canopies, bars, and rams are loaded onto the conveyor. This set is run down the face to where installation is taking place. At all times the signals are transmitted to the three places on the face where work is in progress—at the tailgate end where the chocks are loaded onto the conveyor, at the face where installation is taking place, and at the maingate where withdrawn supports are taken from the conveyor. This sequence is not allowed to be broken and has worked quite well.

Self-advancing Chocks in the Silkstone Seam

The Silkstone Seam lies at a depth of 585 yd., is 38 in. thick including a 1-in. dirt band 5 in. from the floor of the seam. The roof consists of a 2-in. ironstone band immediately above the coal with a hard bind above, while the floor is soft spavin. The full dip is 1 in 15 to the north-east. The layout of the Silkstone Seam South district is shown in Fig. 2.

Power loading commenced at the colliery in January, 1956, on 7s South double- unit face, the left-hand side being 73 yd. long and the right-hand side 120 yd. The left-hand side was machine cut, fired, and hand-filled onto a 20-in. bottom belt conveyor. The right-hand side was machine cut, fired, and the coal loaded out by a Lambton flight loader. The face o.m.s. on the right-hand side was 87.6 cwt.

In July, 1956, the Lambton flight loader was withdrawn and the right-hand side face equipped with an Anderton shearer mounted on a flexible armoured conveyor. Due to the soft nature of the floor of the seam, a Dowty goalpost system was employed. The posts were set on skids consisting of heavy-section corrugated bars, and located in position with 6-in. dia. pipes, 6-in. long welded to the bars at 4-ft. centres. The roof bars were 6 ft. long of light corrugated section, having location boxes welded to them at 4-ft. centres to house the heads of the Dowty props. The waste edge was strengthened by a row of Dowty props set in line with the back legs of the goalpost settings. This system of support was adequate and good roof conditions maintained.

Early in 1957 it was decided to gain experience on 7s South with Seaman Gullick chocks. The reasons that 7s South was chosen are that roof and floor conditions were good, the seam was uniform in section and inclination, and a large area of coal had to be worked near to the face. The face length was short and the officials and workmen were used to other aspects of power loading and would not be seriously handicapped by a change of roof supports.

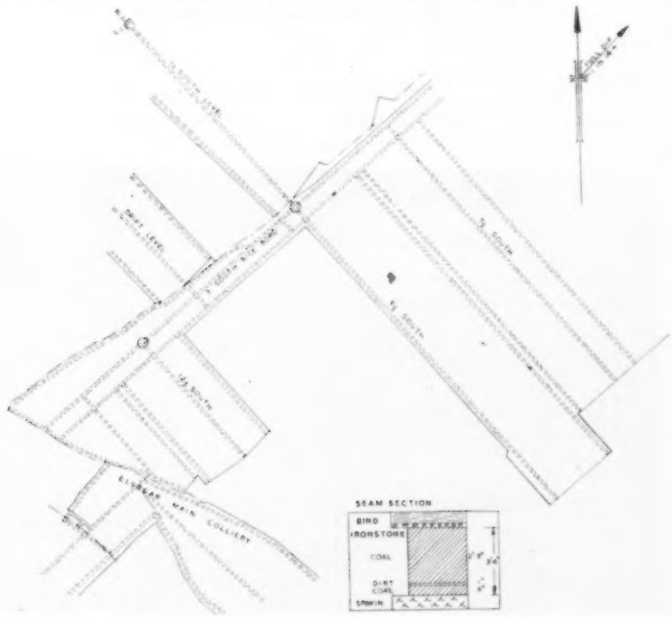


FIG. 2.—LAYOUT OF FACES IN THE SILKSTONE SEAM SOUTH DISTRICT.

The chocks were installed during September, 1957, six chocks being taken along the face, positioned, built, and put under pressure on each night-shift with the exception of the last 11. These were installed in one shift and completed the number of 101 chocks required to support the face length between the stable holes. The stables continued to be supported by pairs of 12-ft. corrugated bars on Dowty props. This method of supporting the roof and advancing the panzer conveyor worked quite satisfactorily. It was decided, therefore, that the replacement unit,

9s South, which is adjacent to 7s South and still working, would be a single unit 186 yd. long supported by Seaman Gullick chocks, the coal being worked by an Anderton shearer.

Support of 9s South Face

The 186-yd. long 9s South face has a 10-yd. stable hole at the maingate end and an 8-yd. stable hole at the tailgate end of the face. The 168-yd. between the stables is the power loader run and the area is supported by self-advancing chocks. Three additional chocks are used, two at the return end of the conveyor and one at the drive head. These are chiefly employed to push over the panzer conveyor at these points and are not principally roof supports.

Each end of the face not supported by walking chocks has a twin setting of roof bars, each supported by four hydraulic props. As the stable hole advances only one of the pair is advanced, leaving the other behind to support the packhole, this bar being brought forward as soon as ripping and packing is completed. The chocks are set 1 ft. apart in the length of face between the gate-side packs, while the chocks opposite the gate-side packs are set 2 ft. apart and have a 6-ft. bar with two hydraulic props set between each chock with the exception of the space opposite the pack corner where two such bars are set. The reasons for this being that as the face advances, the chocks are moved forward, but the props and bars set between the chocks opposite the gate-side packs are left behind to support the new packhole and are not removed until the gate-side packs are completed.

Until September, 1960, the 9s South unit worked on single shift, since that date double-shift working has been in operation. The manpower shown in Table 1 is that required to achieve two strips per shift on two shifts per day.

The wastemen's duties include moving over and grading the conveyor, cleaning up spillage, and advancing supports. The stablemen's duties include cutting, boring, and filling the coal in the stable, setting the supports, and also assisting to push over the conveyor and the Anderton shearer.

The operation of 9s South unit is not necessarily cyclic working, and the machine could be left at any point along the face. In practice, however, two strips per shift are obtained, and the machine is generally left at the maingate end of the face opposite the stable hole. The conveyor is pushed over and the supports advanced before the operators leave the unit (Fig. 3). The ripping team follows on the shift immediately after coal turning. Having completed the dirt disposal and setting of permanent arched girders in the roadway they then reset the props and bars to support the packhole left by the previous shift.

The machine operator and cable man attend to the shearer loader immediately on arriving at the face, changing necessary blunt cutter picks, adding oil to the gearbox where necessary, and making sure the power supply is in order. They make sure that necessary cables are fitted to the machine, and that high-pressure hose, supplying dust-suppression water to the drum, is intact and working correctly. The conveying system, by this time, will be running satisfactorily, and the machine will advance from the gate stable hole along the face. The cable man follows behind the machine (Fig. 4) making sure that the main electric cable, the pilot cable, which controls the panzer conveyor, making it possible for the operator to stop the conveyor and keep the machine standing at any

TABLE 1.—*Manpower at 9s South Face for Four Strips per Day on Two Shifts.*

	6 a.m.	8 a.m.	12 noon	1 p.m.	2 p.m.	10 p.m.	Midnight.
Machine operators	1	—	1	—	—	—	—
Cable men	1	—	1	—	—	—	—
Waste men	—	4	—	—	4	—	—
Maingate stable	3	—	—	—	3	—	—
Tailgate stable	2	—	—	—	2	—	—
Maingate rip	—	—	—	3	—	—	3
Tailgate rip	—	—	—	3	—	3	—
Shotfirers	1	—	—	1	—	—	—
Total	8	4	2	7	9	3	3

FIG. 3.—THE CHOCKS BEING ADVANCED IN THE SILKSTONE SEAM.

point at the face, and water hose do not foul any obstructions along the run of conveyor. The four waste men, arriving at the face 2 hr. after the beginning of the shift, have no supports to move over until the machine is returning from the tailgate stable. The machine operator and cable man can then move over into the stable hole the whole unit immediately they arrive. They make sure that the conveyor in front of the machine is level and grade it to its correct position if required, this being an essential feature of the operation as the machine can quickly climb and so strike the ironstone band roof, or get down into the soft floor leaving top coal sticking to the roof, which occurs if the conveyor does not lie at its correct horizon. If there has been any delay in the stable hole work they will assist the stable hole men until the machine leaves the tailgate stable and continues back to the main gate, ploughing onto the conveyor the coal which is left in the track between the conveyor and the face.

The waste men, following behind the machine, clean up the small amount of spillage left in the track, setting temporary supports where necessary, and move the conveyor over into its new track, being careful not to move the conveyor over too close to the loading machine, as this can wedge the machine to the face and so overload it considerably. When the machine reaches the maingate stable the operator, cable man, and stable men immediately push over the driving gear and the section of panzer conveyor on which the Anderton shearer loader is mounted. By this time the four timber movers will have completed moving over the conveyor and the face is ready for the second strip. The timber men then continue along the face in front of the machine, moving over supports and levelling the conveyor.

Operation of Stable Holes and Gate Ends

At the beginning of each power-loading shift the maingate stable hole will already be advanced 4 ft. 6 in. from the previous coal-turning shift. The stable men, having ascertained that the working place is safe and adequately supported will have cut, bored, and fired the coal prior to filling in the stable hole. As the stable hole advances, one of the pairs of corrugated bars is moved forward, the other remaining stationary throughout the shift.

When all the coal has been loaded out, the timbering system is finally checked and altered to comply with regulations where necessary before leaving the district. The tailgate stable is similarly supported, prepared, and filled out.

TABLE 2.—*Comparison of Results Between an Orthodox Face and a Power-loaded Face in the Silkstone Seam.*

	Hand filled.	Power loaded.
Face o.m.s.	4.95 tons	11.6 tons
Face labour cost per ton	17s. 9.3d.	9s. 10.9d.
Roof support cost per ton	9.8d.	3s. 1.8d.
Accidents per 1,000 tons mined	0.74	0.39
Absenteeism (per cent.)	18.1	9.2

TABLE 3.—*Manpower Requirement for an Orthodox Face, a Power-loaded Face Supported by Dowty Props and a Power-loaded Face with Self-advancing Chocks.*

	Hand filling.	Power-loading, Dowty props.	Power-loading, Gullick chocks.
Fillers	23		
Belt turners	6		
Borers	1	2	1
Shotfirers	4	1	1
Cutters	2		1
Rippers	14	10	7
"Get ready" men	2		
Water infusion	1		
Face unit	1	1	1
Steel checker	1		
Machine men		2	2
Stable hole		4	4
Supports		8	4
Fitter		1	1
Total manpower	55	29	22
O.m.s. (tons)	4.95	8.75	11.60

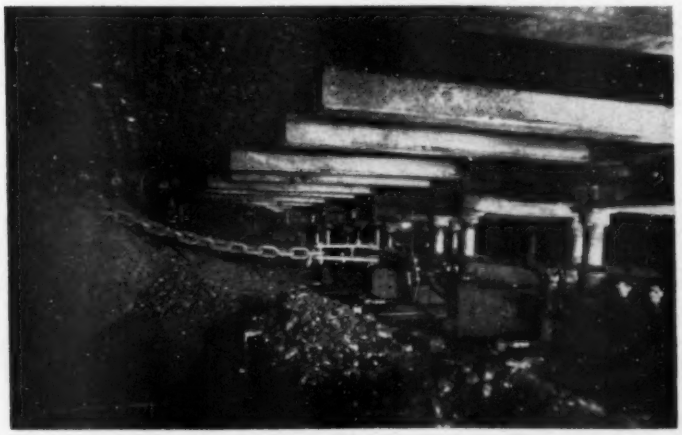


FIG. 4.—ANDERTON SHEARER ON ITS CUTTING RUN.

Table 2 gives a comparison between the face o.m.s., face labour cost per ton, maintenance cost per ton for roof supports, accident rate in terms of 1,000 tons of coal obtained, and the rate of absenteeism between a normal orthodox hand-filled face in the Silkstone Seam producing approximately the same tonnage per turnover as the face supported by self-advancing supports. The face roof support cost includes depreciation of 1s. 11.6d. per ton. Table 3 gives the manpower required to advance a 186-yd. unit 4 ft. 6 in. by the three methods used.

The quantity of air flowing through the face is between 15 and 16,000 cu. ft./min. This quantity is inadequate alone to dilute the firedamp given off to within the prescribed limits. Methane drainage has been introduced in the return gate and the firedamp content in the general body at the 10-yd. sampling point is kept at below 0.6 per cent. Unfortunately, due to the face advancing into virgin ground no reliable figures can be given as to the gas emission per ton of coal obtained on single and double shifts. It would appear, however, that when double shifting is practised the gas emission per ton of coal is reduced, or the quantity of CH_4 in the return is not doubled.

Self-advancing Supports and the Trepanner in the Haigh Moor Seam

The Haigh Moor Seam lies at a depth of 383 yd. and varies in thickness due to a dirt band 12 in. from the floor of the seam thickening from 3 in. at the east side of the take to over 36 in. at the west side. There is 40 in. of coal including a 4-in. band of inferior quality 6 in. from the roof. The roof and floor are of medium bind and the full dip is 1 in 15 to the north-east.

The seam in the east of the take had been fairly extensively worked by conventional methods when in 1958 it was decided to introduce power loading. In the area still to be worked the dirt band thickened rapidly from a minimum of 14 in. to over 36 in. It was decided therefore that the section on top of the dirt band would be power loaded by the AB trepanner.

West Rise 5s face, shown in Fig. 5, was developed to a length of 172 yd. and equipped with a flexible armoured conveyor, an AB trepanner and all the necessary additional switchgear and equipment. The roof was supported by the goalpost system previously described using Becorit breaker prop chocks set at 4-yd. centres to strengthen the waste edge. The face started production in April, 1959. The AB trepanner worked satisfactorily from the outset, loading at a maximum rate of 5.5 ft./min.

The system of support, however, was not satisfactory. Due to the soft nature of the dirt band, the skid bars were bending and the hydraulic props were pushing the front end of the skid bars into the floor. The Becorit breaker prop chocks were also penetrating the dirt band, allowing the roof to break off at the face. Advancing the roof supports was extremely difficult and expensive in both manpower and time. The machine was frequently delayed because the supports could not be advanced fast enough. A modified goalpost system of support was then introduced with prefabricated chocks set at 4-ft. centres.

Slight improvements in both the roof conditions and the results were obtained, but still the trepanner was delayed due to continued difficulty in advancing the supports. It was finally decided to equip the face with self-advancing supports and link bars.

The faces in the West Rise district are 172 yd. long and extending as they advance to 217 yd. long. The system of support is shown in Fig. 6. A 12-yd. stable is maintained at each end of the face. Self-advancing chocks are set throughout the panzer conveyor run. The chocks set between the waste side of the gateside packs being 1 ft. apart and those set in the packholes and across the gates being 2 ft. apart.

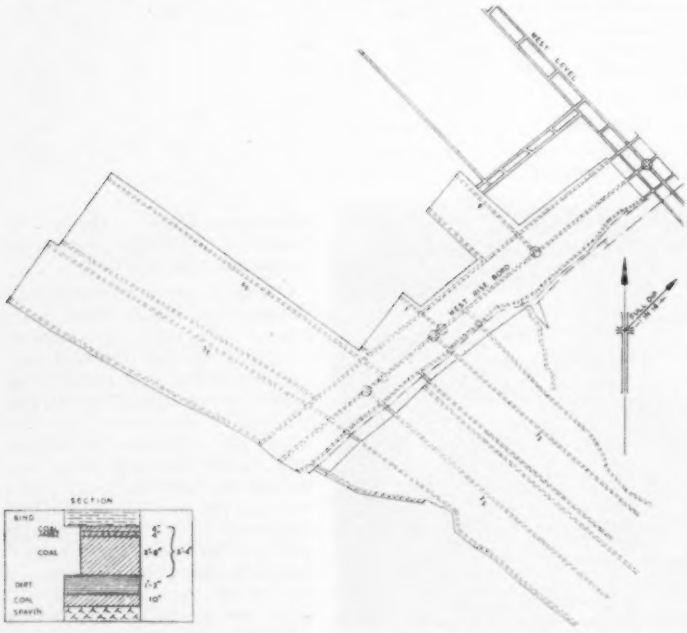


FIG. 5.—LAYOUT OF FACES WORKING THE HAIGH MOOR SEAM IN THE WEST RISE DISTRICT AT CORTONWOOD COLLIERY.

Vanwersch 52/96 link bars are bolted to the chocks to provide support to the roof. In the packholes and across the gates, 6-ft. corrugated bars are set on hydraulic props. The stable holes are supported by pairs of 12-ft. corrugated bars set on hydraulic props. One bar in each pair being moved forward as the stable hole advances, the other being left to support the packhole. A pair of 6-ft. bars on hydraulic props are set at the waste end to prevent the waste breaking down into the packhole.

Power loading is carried out on all three shifts. The manpower given in Table 4 is that

TABLE 4.—*Manpower Requirements for 400 yd. of Stripping per Shift at a Face Equipped with a Trepanner and Self-advancing Chocks in the Haigh Moor Seam.*

	6 a.m.	10 a.m.	1 p.m.	2 p.m.	10 p.m.	Mid-night.
Machine operators	1			1	1	
Cable men	1			1	1	
Filling spillage on the face side ..	1			1	1	
Advancing conveyor	1			1	1	
Waste men ..	2			2	2	
Maingate stable ..	4			3	4	
Tailgate stable ..	3			4	3	
Maingate rip ..	5		5		5	
Tailgate rip ..	3		3		3	
Extending rib-side conveyor ..		2				2
Mechanics	1			1	1	
Shotfirers	2		2		2	
Total	24	2	10	14	24	2 76

required to achieve 400 yd. of stripping per shift, three shifts per day.

All the men in the power-loading team on a particular shift arrive at the face at the same time. The machine operator, cableman, and face-side spillage cleaner change the necessary picks, check oil levels, cables, and water hose before commencing to strip. The face-side spillage cleaner follows immediately behind the machine and cleans any spillage left by the trepanner. He also draws the machine operator's attention should any bottom coal be left down. Screw-jack props are set behind the machine to support the roof while the spillage is being cleaned up.

Some 15 yd. behind the machine another man is employed operating the rams to push over the conveyor and cleaning any spillage left by the conveyor. The waste men follow about 5 yd. from where the conveyor has been pushed over. They release the chocks, advance them and reset them to the roof. The machine travels along the face to the stable hole when all the six men complete pushing over (Fig. 7) and then go to a specific job on the machine to prepare it for its return run. It is essential that if valuable time is not to be lost that each man knows exactly what duty to perform in preparing the machine for its return run in the shortest possible time.

The stables are machine cut, bored, fired, and hand filled onto the panzer conveyor. The manpower in the stables is so organized that the equivalent of three and a half shifts are worked in each stable on every stripping shift. If there are four men in the maingate stable on the dayshift there will be three men on the afternoon shift and four on every other nightshift, assisting to push over

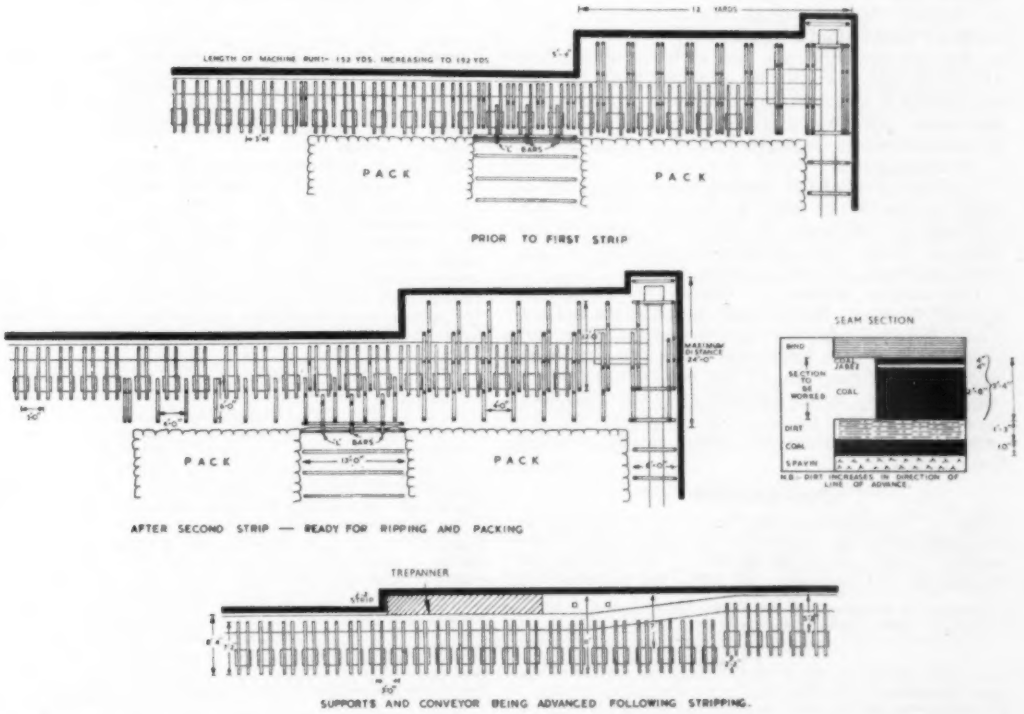


FIG. 6.—SYSTEM OF SUPPORT FOR BOTH THE FACE AND THE STABLES AT WEST RISE NO. 7 FACE WORKING THE HAIGH MOOR SEAM.

the conveyor, the machine being included in the stable men's duties. Two teams of two men in each are employed dinting the ribside gate to a depth of 15 in. and extending the PA30 chain conveyor. The dirt from the dint is packed into the gate-side pack, the PA30 conveyor being extended between the stripping shifts.

Main and tailgates are ripped on three shifts per day. The stone is brought down by explosive and the dirt packed by hand. As packing proceeds the 6-ft. and 12-ft. bars are advanced.

The quantity of air flowing through the face is between 12,000 and 13,000 cu. ft./min. This was insufficient to dilute the CH_4 given off to below the prescribed limit even when double shifting is practised. Methane drainage was installed in the return gate and the 10-yd. sample kept below 0.6 per cent. It would appear from the samples taken that a reduction in the gas emission per ton of coal of between 15 and 20 per cent. can be expected when the rate of advance is increased from double- to treble-shift operation. This figure is not a true comparison as the face increased in length from 172 yd. to 217 yd. as it advanced.

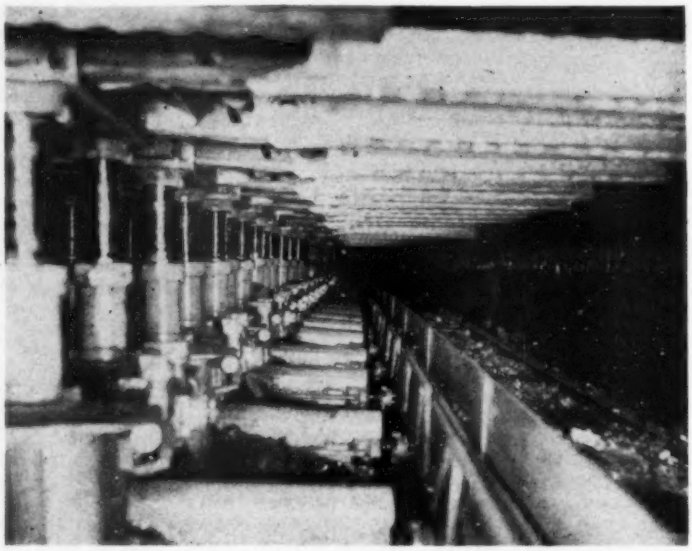


FIG. 7.—CONVEYOR MOVED OVER AND CHOCKS ADVANCED READY FOR THE NEXT TREPANNING STRIP.

The results of power loading in the Haigh Moor Seam in the West Rise districts, compared with conventional methods, are given in Table 5 and Table 6 shows the manpower required for the three methods of roof support used.

The author wishes to thank Mr. H. Heap, general manager, No. 3 Area, North-Eastern Divisional Coal Board, for permission to give this paper and he also expresses thanks to the Area mechanization department, the Area photographer and the colliery surveying staff for their assistance in preparing the paper. The opinions are the author's and not necessarily those of the National Coal Board.

DISCUSSION

MR. F. FAIRCLOUGH, referring to the solution of approximately 2 per cent. oil and water used in the support circuit, asked for details of maintaining the strength of the solution. In reply, the AUTHOR said it would be more accurate to say that the minimum percentage of oil required in the solution was 2 per cent. There was no mechanical means of checking the solution and officials and fitters noted the condition of the emulsion on their inspections and when necessary added oil.

MR. H. P. A. JOHNSON asked for details of the cost of the installation of powered supports and the approximate life of the chocks. It had generally been accepted that this type of support was suited to installations with very good roof conditions and asked whether this roof-support system could be applied to power-loading machine similar to the trepanner. Mr. Johnson noted that with Dowty props, 10 rippers were employed, and when Gullick chocks were installed seven rippers were employed. Also with

TABLE 5.—*Comparison of Results in the Haigh Moor Seam with Power Loading and Conventional Methods.*

	Hand filled.	Power loaded.
Face o.m.s.(tons)	5.13	10.75
Face labour cost per ton	15s. 11.3d.	9s. 3.7d.
Roof support cost per ton	7.5d.	1s. 4.2d.
Accidents per 1,000 tons mined	0.87	0.43
Absenteeism	18.9	16

TABLE 6.—*Manpower Requirements for the Three Methods of Roof Support Used.*

	Hand filling.	Power-loading, Dowty props.	Power-loading, Gullick chocks.
Fillers	22		
Belt turners	4		
Waste workers	6		
Borers	2		
Shotfirers	5	2	2
Cutters	2		
Rippers	11	7	8
Face unit	1	1	
Steel checkers	2		
Machine men		3	3
Stable hole		6	7
Supports		8	3
Fitters		1	1
Dint men		2	2
Dowty prop maintenance		1	
Total manpower	55	31	26
O.m.s. (tons)	5.13	4.43	10.75

the Dowty system two borers were used, whereas with the Gullick chocks, one borer was shown. He asked for the reasons for these differences.

The total cost of the equipment on 9s South face, replied the AUTHOR, was £61,349 and at the West Rise faces £64,399. The chock life had been assumed at five years and with good maintenance, proper use and regular rates of advance, they should last. This type of support could be used in all cases where the roof was fairly good, even if the floor was soft. On West Rise 5s face, the support given by the goal-post system was insufficient. After chocks were installed and the roof was controlled, conditions and results improved. Slusher packing at the rips had been introduced since the original power loader was started and this accounted for the reduction in the number of rippers. When double shifting commenced the borers were transferred to the stable team.

Working Over Pillars

MR. G. GALLOWAY asked if the author had had any experience of working over pillars and if any difficulties during a weekend stand or annual holidays had been encountered. He also asked for further details of the statement that the minimum lowering of the chocks should be at least 6 in.

In reply, the AUTHOR said a pillar had been crossed when working the West Rise 5s face. The weight and convergence in this area were greater than normal, but not sufficient to create any difficulties or reduce the rate of advance. The difficulties arising out of a weekend or holiday stand were due to floor lift and were generally overcome after the first strip. A minimum of 6 in. leg extension was necessary to overcome undulations in the roof, sometimes caused by the machine not cutting at exactly the same horizon as it did on the previous strip or strips.

The AUTHOR told MR. J. T. E. JONES, who asked what was the minimum distance allowed from the front self-advancing chocks to the coal face, that the distance was 7 ft.

MR. E. BRAMMER noted that two men were used to extend the rib-side conveyor and asked if there was some other work they did that has not been mentioned. He also asked if the o.m.s. was based on the saleable output or the pithead weight. At the trepanner face it had been said that temporary props were set, but there was no man booked for setting these supports. Mr. Brammer said at the Haigh Moor face, two shotfirers on each shift seemed a lot for just two stables and the rippings, and asked if there was some other work they did that had not been mentioned.

Replying, the AUTHOR said that in addition to extending the ribside conveyor, the two men took up 15 in. of floor dirt and packed it into the ribside packhole. They also prepared the necessary pans and chain to extend the conveyor. The o.m.s. was pithead weight. The temporary supports were set by the man who cleaned up the spillage at the face side of the conveyor. Two shotfirers were employed so that the rippers and stable men did not lose valuable time waiting for shots to be fired. With three-shift working, time must not be lost if the stables and ripping were to advance in sequence with the face lines. The shotfirers also organized the stable support to receive the machine.

In reply to MR. G. A. HALLOWS, the AUTHOR said the percentage of large coal over 2 in. obtained by the trepanner was between 32 and 35 and that obtained by the shearer 5.

MR. H. T. WESTON said that, according to the face o.m.s., results showed that an approximate increase of 100 per cent. had been obtained at power-loaded faces compared with hand-filled faces. He asked what was the overall o.m.s. when the faces were supported by the goalpost or orthodox system, and when the self-advancing support system was used. He also asked if the increase was solely due to the saving of manpower or if there were any other factors affecting the increase in o.m.s.

Replying, the AUTHOR said the overall o.m.s. when orthodox methods were employed was 32.5 cwt.; in 1960, with two chock faces working, 34.6 cwt. was obtained. The increase was due to the introduction of power loaders in conjunction with the self-advancing supports.

MR. R. A. MACDONALD was interested in the reduced absenteeism figures and asked if this was due to the fact that as there were fewer men employed at the face, a more careful selection was possible. The manpower at the power-loaded faces, replied the AUTHOR, was not selected, but due to a system of job allocation at the pit, those workmen who were not in regular jobs were employed first. The reason that the absenteeism was reduced was that the work was more interesting and varied, and the team spirit was higher in a small team of men.

MR. R. H. BONELL asked for the reason for the difference in absenteeism between the two seams worked. He also asked if it was common practice to lock the wedge arrangement on the link bars so as to adjust them according to the roof. Replying, the AUTHOR said power loading took place on all three shifts at the trepanner face. This was the reason for the increase in absenteeism. In practice it was found that when the bars were set to a profile to suit the roof, very little adjustment was necessary unless undulations in the roof appeared.

MR. E. BRAMMER said that in the table showing manpower in the West Rise district, the productivity for hand filling was roughly normal, but when power loading in conjunction with Dowty props it was low—only 4.43 ton/per man. He asked why, when power loading using Dowty props, the o.m.s. was reduced to roughly half the normal figure.

The AUTHOR said that, due to the very soft floor, the Dowty props were pushing the ends of the skid bars into the floor. This created difficulties in advancing the supports and the machine had to be stopped frequently to allow the supports to catch up with the machine.

MR. H. P. A. JOHNSON commented that HM Inspectorate were insisting upon the setting of an additional prop and it was deterring a lot of people from using the powered-support system. The AUTHOR thought that it would be a retrograde step to introduce an intermediate support between the chocks at Cortonwood Colliery. To do so would mean that the distance between the face and the waste would have to be increased.

Excessive Roof Movement

MR. F. FAIRCLOUGH said that the floor was likely to lift between the face setting and the conveyor and asked if the ram, being attached to the conveyor, tended to bend under the weight of a conveyor-mounted power loader. He also asked if there had been any excessive roof movement at the face to push the chocks down solid, and, if so, what method had been used for getting them out.

In reply, the AUTHOR said there was sufficient freedom of movement between the ram and the chock, and the ram and conveyor to prevent rams being bent except when floor heave was excessive. Bent rams had occurred from time to time, but not frequently. They had experienced chocks getting fast and this was usually

the conveyor, the machine being included in the stable men's duties. Two teams of two men in each are employed dinting the ribside gate to a depth of 15 in. and extending the PA30 chain conveyor. The dirt from the dint is packed into the gate-side pack, the PA30 conveyor being extended between the stripping shifts.

Main and tailgates are ripped on three shifts per day. The stone is brought down by explosive and the dirt packed by hand. As packing proceeds the 6-ft. and 12-ft. bars are advanced.

The quantity of air flowing through the face is between 12,000 and 13,000 cu. ft./min. This was insufficient to dilute the CH_4 given off to below the prescribed limit even when double shifting is practised. Methane drainage was installed in the return gate and the 10-yd. sample kept below 0.6 per cent. It would appear from the samples taken that a reduction in the gas emission per ton of coal of between 15 and 20 per cent. can be expected when the rate of advance is increased from double- to treble-shift operation. This figure is not a true comparison as the face increased in length from 172 yd. to 217 yd. as it advanced.

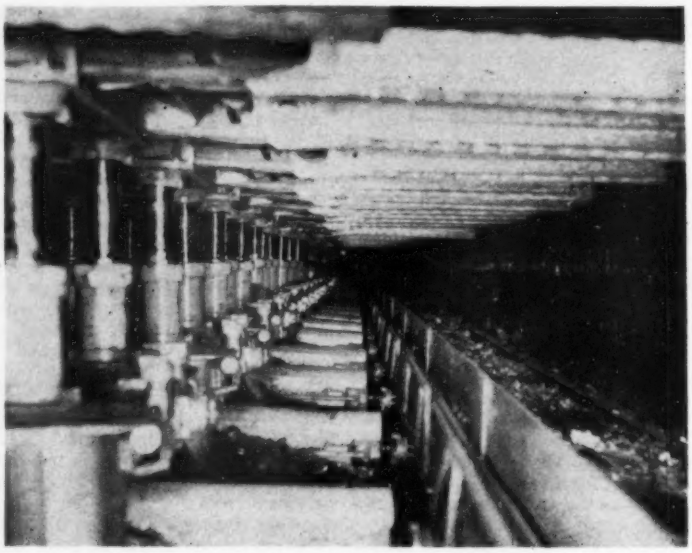


FIG. 7.—CONVEYOR MOVED OVER AND CHOCKS ADVANCED READY FOR THE NEXT TREPANNING STRIP.

The results of power loading in the Haigh Moor Seam in the West Rise districts, compared with conventional methods, are given in Table 5 and Table 6 shows the manpower required for the three methods of roof support used.

The author wishes to thank Mr. H. Heap, general manager, No. 3 Area, North-Eastern Divisional Coal Board, for permission to give this paper and he also expresses thanks to the Area mechanization department, the Area photographer and the colliery surveying staff for their assistance in preparing the paper. The opinions are the author's and not necessarily those of the National Coal Board.

DISCUSSION

MR. F. FAIRCLOUGH, referring to the solution of approximately 2 per cent. oil and water used in the support circuit, asked for details of maintaining the strength of the solution. In reply, the AUTHOR said it would be more accurate to say that the minimum percentage of oil required in the solution was 2 per cent. There was no mechanical means of checking the solution and officials and fitters noted the condition of the emulsion on their inspections and when necessary added oil.

MR. H. P. A. JOHNSON asked for details of the cost of the installation of powered supports and the approximate life of the chocks. It had generally been accepted that this type of support was suited to installations with very good roof conditions and asked whether this roof-support system could be applied to power-loading machine similar to the trepanner. Mr. Johnson noted that with Dowty props, 10 rippers were employed, and when Gullick chocks were installed seven rippers were employed. Also with

TABLE 5.—*Comparison of Results in the Haigh Moor Seam with Power Loading and Conventional Methods.*

	Hand filled.	Power loaded.
Face o.m.s.(tons)	5.13	10.75
Face labour cost per ton	15s. 11.3d.	9s. 3.7d.
Roof support cost per ton	7.5d.	1s. 4.2d.
Accidents per 1,000 tons mined ..	0.87	0.43
Absenteeism	18.9	16

TABLE 6.—*Manpower Requirements for the Three Methods of Roof Support Used.*

	Hand filling.	Power-loading, Dowty props.	Power-loading, Gullick chocks.
Fillers	22		
Belt turners	4		
Waste workers	6		
Borers	2		
Shotfirers	5	2	2
Cutters	2		
Rippers	11	7	8
Face unit	1	1	
Steel checkers	2		
Machine men		3	3
Stable hole		6	7
Supports		8	3
Fitters		1	1
Dint men		2	2
Dowty prop maintenance		1	
Total manpower ..	55	31	26
O.m.s. (tons)	5.13	4.43	10.75

the Dowty system two borers were used, whereas with the Gullick chocks, one borer was shown. He asked for the reasons for these differences.

The total cost of the equipment on 9s South face, replied the AUTHOR, was £61,349 and at the West Rise faces £64,399. The chock life had been assumed at five years and with good maintenance, proper use and regular rates of advance, they should last. This type of support could be used in all cases where the roof was fairly good, even if the floor was soft. On West Rise 5s face, the support given by the goal-post system was insufficient. After chocks were installed and the roof was controlled, conditions and results improved. Slusher packing at the rips had been introduced since the original power loader was started and this accounted for the reduction in the number of rippers. When double shifting commenced the borers were transferred to the stable team.

Working Over Pillars

MR. G. GALLOWAY asked if the author had had any experience of working over pillars and if any difficulties during a weekend stand or annual holidays had been encountered. He also asked for further details of the statement that the minimum lowering of the chocks should be at least 6 in.

In reply, the AUTHOR said a pillar had been crossed when working the West Rise 5s face. The weight and convergence in this area were greater than normal, but not sufficient to create any difficulties or reduce the rate of advance. The difficulties arising out of a weekend or holiday stand were due to floor lift and were generally overcome after the first strip. A minimum of 6 in. leg extension was necessary to overcome undulations in the roof, sometimes caused by the machine not cutting at exactly the same horizon as it did on the previous strip or strips.

The AUTHOR told MR. J. T. E. JONES, who asked what was the minimum distance allowed from the front self-advancing chocks to the coal face, that the distance was 7 ft.

MR. E. BRAMMER noted that two men were used to extend the rib-side conveyor and asked if there was some other work they did that has not been mentioned. He also asked if the o.m.s. was based on the saleable output or the pithead weight. At the trepanner face it had been said that temporary props were set, but there was no man booked for setting these supports. Mr. Brammer said at the Haigh Moor face, two shotfirers on each shift seemed a lot for just two stables and the rippings, and asked if there was some other work they did that had not been mentioned.

Replying, the AUTHOR said that in addition to extending the ribside conveyor, the two men took up 15 in. of floor dirt and packed it into the ribside packhole. They also prepared the necessary pans and chain to extend the conveyor. The o.m.s. was pithead weight. The temporary supports were set by the man who cleaned up the spillage at the face side of the conveyor. Two shotfirers were employed so that the rippers and stable men did not lose valuable time waiting for shots to be fired. With three-shift working, time must not be lost if the stables and ripping were to advance in sequence with the face lines. The shotfirers also organized the stable support to receive the machine.

In reply to MR. G. A. HALLOWS, the AUTHOR said the percentage of large coal over 2 in. obtained by the trepanner was between 32 and 35 and that obtained by the shearer 5.

MR. H. T. WESTON said that, according to the face o.m.s., results showed that an approximate increase of 100 per cent. had been obtained at power-loaded faces compared with hand-filled faces. He asked what was the overall o.m.s. when the faces were supported by the goalpost or orthodox system, and when the self-advancing support system was used. He also asked if the increase was solely due to the saving of manpower or if there were any other factors affecting the increase in o.m.s.

Replying, the AUTHOR said the overall o.m.s. when orthodox methods were employed was 32.5 cwt.; in 1960, with two chock faces working, 34.6 cwt. was obtained. The increase was due to the introduction of power loaders in conjunction with the self-advancing supports.

MR. R. A. MACDONALD was interested in the reduced absenteeism figures and asked if this was due to the fact that as there were fewer men employed at the face, a more careful selection was possible. The manpower at the power-loaded faces, replied the AUTHOR, was not selected, but due to a system of job allocation at the pit, those workmen who were not in regular jobs were employed first. The reason that the absenteeism was reduced was that the work was more interesting and varied, and the team spirit was higher in a small team of men.

MR. R. H. BONELL asked for the reason for the difference in absenteeism between the two seams worked. He also asked if it was common practice to lock the wedge arrangement on the link bars so as to adjust them according to the roof. Replying, the AUTHOR said power loading took place on all three shifts at the trepanner face. This was the reason for the increase in absenteeism. In practice it was found that when the bars were set to a profile to suit the roof, very little adjustment was necessary unless undulations in the roof appeared.

MR. E. BRAMMER said that in the table showing manpower in the West Rise district, the productivity for hand filling was roughly normal, but when power loading in conjunction with Dowty props it was low—only 4.43 ton/per man. He asked why, when power loading using Dowty props, the o.m.s. was reduced to roughly half the normal figure.

The AUTHOR said that, due to the very soft floor, the Dowty props were pushing the ends of the skid bars into the floor. This created difficulties in advancing the supports and the machine had to be stopped frequently to allow the supports to catch up with the machine.

MR. H. P. A. JOHNSON commented that HM Inspectorate were insisting upon the setting of an additional prop and it was deterring a lot of people from using the powered-support system. The AUTHOR thought that it would be a retrograde step to introduce an intermediate support between the chocks at Cortonwood Colliery. To do so would mean that the distance between the face and the waste would have to be increased.

Excessive Roof Movement

MR. F. FAIRCLOUGH said that the floor was likely to lift between the face setting and the conveyor and asked if the ram, being attached to the conveyor, tended to bend under the weight of a conveyor-mounted power loader. He also asked if there had been any excessive roof movement at the face to push the chocks down solid, and, if so, what method had been used for getting them out.

In reply, the AUTHOR said there was sufficient freedom of movement between the ram and the chock, and the ram and conveyor to prevent rams being bent except when floor heave was excessive. Bent rams had occurred from time to time, but not frequently. They had experienced chocks getting fast and this was usually

caused by not cleaning up the bottom coal properly or leaving up top coal, thus reducing the working section. When chocks were fast the only thing that one could do was dig them out. This was comparatively easy when top coal was left, but difficult when bottom coal was left down.

MR. LEE asked if there was any difficulty due to the conveyor moving along the face and carrying the supports with it. He also asked if rams were bent when chocks were not at right angles to the conveyor and if measurement were taken of the loads carried by the supports to show what maximum convergence occurred.

In reply, the AUTHOR said the amount of conveyor creep was small. Holes were drilled in the spill-plates at 6-in. centres so that the rams could be adjusted if necessary. Adjustments were made periodically, but not very often. Rams had been bent occasionally but there was sufficient flexibility between the chock and the conveyor to allow normal creep to take place without damage to the rams. Convergence readings had been taken, but not when difficulties were being experienced. The maximum convergence took place when the rate of advance was reduced.

MR. P. GRANT asked if, with the rapid face advance, considerable maintenance shifts in the gates had to be spent in order to keep them in good condition. Replying, the AUTHOR said the increased rate of advance had not caused any deterioration in gate conditions. Both main gates in the Haigh Moor Seam advanced 800 yd. without any repairs. In the tailgates on both these faces it was necessary to take a small dint in certain sections. This dint would have been taken with orthodox working and slower rates of advance.

In answer to MR. P. HEDLEY, the AUTHOR said that originally the electric power was taken along the tailgate, but due to the increase in the CH_4 content it was considered safer to supply the tailgate equipment from the main gate, cables being run along the face in the cable carrier attached to the conveyor. Methane drainage was used on both faces but the power was still fed from the main intake gate.

MR. J. W. L. ANDERSON noted that the setting load of each chock was 11.2 tons, and wondered whether this was rather a light setting load in view of the fact that this was presumably spread over four props forming a chock. The setting load could be varied by increasing or decreasing the pressure produced by the pump, replied the AUTHOR. The setting load of 11.2 tons had not been varied and was proving quite satisfactory.

Costs of Roof Bolting

COMPARATIVE costs of roof bolting and conventional timbering under similar bituminous coal-mining conditions are analyzed by the US Bureau of Mines in Information Circular 8024, copies of which can be obtained from the bureau (4,800, Forbes Avenue, Pittsburgh 13, Pa.). Information in the report is based on the bureau's study of 14 representative mines in Pennsylvania, Ohio, and West Virginia.

Roof-bolting, introduced and promoted by the Bureau of Mines, has supplanted conventional timbering in most of the larger and more productive coal mines of the United States in the past 10 years. It has replaced timbering in 13 of the 14 mines studied in the report.

CANADIAN ZINC PRODUCTION in 1960 amounted to 405,620 short tons, or 9,612 tons more than in 1959.

HEATING, VENTILATING, AND AIR-CONDITIONING EXHIBITION

SPONSORED by the Institution of Heating and Ventilating Engineers, the first International Heating, Ventilating, and Air-conditioning Exhibition is to be held at Olympia, London, from September 26 until October 6, inclusive. During the period of the exhibition, there will be an international conference organized by the institution.

Included in the exhibitors will be the Aga Heating division of Allied Ironfounders, Limited, which will be showing seven domestic boilers, ranging from the small 12,000 B.t.u./hr. coke-fired Aga SF 12, suitable for hot water only, to the large OFK 70 oil-fired pressure jet boiler, rated at 70,000 B.t.u./hr. On view from the company's range of industrial boilers will be two large appliances manufactured by subsidiary companies of the group: the Kayenso NSB 40 steam boiler, developing 4,000 lb. of steam per hour, and the Watts 500A/C gravity-feed solid-fuel boiler. A Watts gravity-feed stoker will also be shown.

The firm whose fans are used to air-condition the Houses of Parliament, Davidson & Company, Limited, Belfast, will demonstrate the latest design of Sirocco air-conditioning plant. An interesting development in Davidson equipment is a method of steam humidifying, particularly valuable for use in surgical operating theatres and biological laboratories.

For the first time at Olympia, Keith Blackman, Limited, London, N.17, which has supplied mine ventilating fans all over the world, will show a new fan combining the space-saving advantages of the axial fan with the performance characteristics of the centrifugal fan. It is called the Ax-Cent Bifurcated fan, and is particularly suitable for high-temperature work up to 650 deg. F.

Fuel Efficiency in India

TWO British experts on fuel utilization efficiency, touring India at the invitation of the Government of India, have recommended the setting up of a fuel efficiency service, modelled on the National Industrial Fuel Efficiency Service in Britain. The experts, Mr. C. A. J. Plumer and Mr. B. R. Addicot, have submitted a preliminary report to the Government.

They have been asked by the Government to advise selected industries regarding the efficiency of fuel utilization and report to the Government the steps that might be taken for careful husbandry in the use of all forms of fuel, particularly in view of the transport difficulties experienced in the movement of coal.

Mr. Plumer and Mr. Addicot have found, it is stated, that there is great scope in India for fuel saving. They are reported to have emphasized that it is not easily realized that fuel is really a tool for industry and that its correct use not only saves coal—a valuable indigenous material—but releases the strain on transport. They have already met the Central Coal Controller at Calcutta and discussed with him the problem of coal movement and have suggested steps to improve the general pattern of coal supply to industries.

Ore-handling Installation at Scunthorpe

GEC PLANT FOR LYSAGHT'S WORKS

The new sinter plant and ore-handling installation at Lysaght's Scunthorpe Works have been designed to handle 600 tons of run-of-mine ore per hour. Main contractor for the project was Head Wrightson Iron & Steel Works Engineering, Limited, which placed an order for ore-handling plant with the General Electric Company, Limited. Certain equipment for this installation was also supplied by the GEC through Ross Engineers, Limited. Total value of the GEC contracts was approximately £700,000 and included a 60-ton side-discharge wagon tippler, crushers, conveyors, screens, and feeders.

THREE types of ore are handled in the new plant, namely, Lincolnshire (Navvy), Northamptonshire (Northants), and French. Of these three, Northants ore has proved to be the most difficult to handle because its moisture content is variable over a wide range, sometimes exceeding 20 per cent. The Navvy ore is obtained by open-cast mining from an adjoining ore bed. It is estimated that there is something like 25,000,000 tons of ore available in this bed, although it is of poor quality, its ease of recovery makes it an economical proposition.

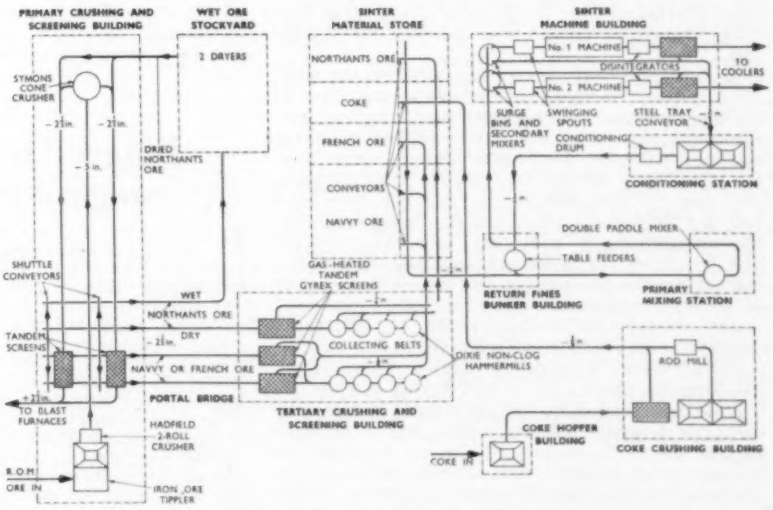
The foundations of the new plant are built on a worked-out portion of this ore bed which has been subsequently back-filled to grade level with hard core.

Primary Crushing and Screening

Ore is fed into the primary crushing and screening system through the GEC wagon tippler. Two stages of crushing are performed, first to minus 5 in. in a Hadfield two-roll crusher and then to minus 2½ in. by two Symons cone crushers before the ore is passed over the Gyrex primary screens. At this point the plus 2½-in. rubble can be directed to the buffer bunker building for supplying the blast furnaces. The minus 2½-in. throughs from the two sets of primary screens are fed onto one of four belts by means of two shuttle conveyors. The four belts are carried in a portal bridge to the fine screening and tertiary crusher building, and under normal operating conditions two of the belts handle either Navvy or French ores, while the other two carry Northants ore, one being used for the wet ore and the other for the dry ore.

The Northants ore has to be dried before it can be screened and tertiary crushed; hence the Northants conveyor used for this wet ore passes straight through the tertiary crusher building out to the wet-ore stockyard. Here two dryers are installed which reduce the moisture content of the ore to approximately 13 per cent. before it is reintroduced into the system just after the Symons cone crushers in the primary crusher house.

The dry Northants ore is transported to the tertiary crusher building by the other Northants belt which feeds two gas-heated Gyrex screens in tandem arrangement fitted with a ¼-in. mesh. The throughs from these screens are carried direct to



FLOW DIAGRAM OF SINTER PLANT AT LYSAGHT'S SCUNTHORPE WORKS.

the sinter-material store, while 85 per cent. of the oversize is first reduced to minus ½ in. by two GEC Dixie non-clog hammermills before joining the throughs on their way to the sinter-material store.

Since the Navvy and French ores are not as sticky as the Northants ore, no provision is made for drying them. Each of the two conveyors carrying these ores from the primary crusher building feeds Gyrex gas-heated screens in tandem. These screens, which are fitted with a ½-in. mesh, are installed in the tertiary crusher building. An arrangement of collecting belts underneath the screens directs the throughs onto a single belt which carries the ore to the appropriate bunker in the sinter-material store. The oversize ore is first passed through one of three hammermills which reduces 85 per cent. of it to minus ½ in. before it joins the throughs passing to the sinter-material store.

The five hammermills are supplied with ore by apron feeders located underneath surge bunkers which are kept filled by shuttle conveyors situated above them. One shuttle conveyor serves the three surge bunkers in the Navvy or French line, while another supplies the ore to the two surge bunkers in the Northants line. Provision has been made for the installation at a later date of another hammermill in the Navvy line and two more in the Northants line.

The hammermills used in the tertiary crusher building are GEC Dixie 3650 non-clog machines. For the Navvy ore line the mills are fitted with moving breaker plates only, but for the Northants ore, moving back plates are also fitted.

Handling and Storage of Raw Materials

There are four separate bulk-storage pits for the prepared ores and the coke in the sinter-material store. Storage capacities of these pits are:—Navvy ore, 19,000 tons; French ore, 7,000 tons; Northants ore, 13,000 tons; coke, 2,000 tons. GEC conveyors unload the ore into the storage pits.

Ore is recovered from the store by the grab of a 12-ton overhead crane which tips the reclaimed ore into circular bins supplying variable-speed rotating tables fitted with plough discharge facilities. Two of these table feeders can be used for discharging Navvy ore, two for the Northants ore, two for the French ore, two for coke, and two for flue dust. Provision has been made for the installation of a further four table feeders and bins, two for Northants and two for Navvy ore. Thus the proportions for the sinter mix can be regulated from this point, a typical mix consisting of (per cent.):—Navvy ore, 43; Northants ore, 38; French ore, 7; coke breeze, 8; flue dust, 4.

No provision is made for adding limestone, as the furnaces operate on a self-fluxing burden.

Coke is unloaded by a track hopper system into the coke hopper building, which has a capacity of 148 tons. It is extracted from beneath the hopper at a uniform rate of 80 ton/hr. by a Sherwen electromagnetic vibrating feeder. This feeder directs the coke onto a conveyor system terminating in the coke-crushing building. Here the minus ⅛-in. fraction is screened out and passed by conveyors direct to the sinter-material store. The plus ⅛-in. coke fraction falls into bunkers, from which it is removed by Sherwen feeders and passed through rod mills set to give a product size of minus ⅛ in. The output of the rod mills then joins the screened throughs going to the sinter-material store.

Originally conceived as a process for agglomerating fine ores, sintering is now recognized as an important prerefining step in the preparation of a blast-furnace burden. A considerable amount of GEC conveying equipment is installed for transporting the ore from the sinter-material store to, through, and out of the sinter-machine building.

A 500-ft.-long belt carries the raw material from the sinter-material circular bins to the primary mixing station, where it is mixed in a large revolving-drum double paddle-shaft mixer. From here the raw mix is conveyed via an upper storey in the return fines building to two surge bins and secondary mixers in the sinter-machine building, the distribution to the bins being regulated by a reversible belt.

Each surge bin feeds a 168-ft.-long sinter machine through a conveyor and a swinging spout which spreads the raw mix onto the machine strand. After passing through the machine the hot sinter is directed through a disintegrator, and then over a hot-sinter screen which removes the minus ¾-in. fraction.

All oversize is passed through a cooler before being taken by a 900-ft.-long conveyor system to the blast-furnace bunker building.

The dust collected by the belts underneath the sinter strands is joined by the throughs from the hot-sinter screens and fed by a steel tray conveyor into the hoppers of a conditioning station. From these hoppers the fines are passed through a conditioning drum onto a conveyor which takes them to the return fines bunker building. They are then discharged by table feeders onto the raw-mix conveyor ascending to the primary mixing station.

Bigger Ore Fleet for Grängesberg Company

GROSS profit of the Grängesberg Company, the large Swedish producers of iron ore and steel and owners of a big ore-carrying fleet, for 1960 was 154,400,000 kronor (£10,400,000), compared with 127,100,000 kronor for 1959. Net profit was up from 29,100,000 kronor to 38,800,000 kronor.

Ore shipments rose from 1,620,000 tons to 2,170,000 tons, including 1,720,000 tons for export.

The new steelworks at Oxelösund was partly brought into operation during the year and deliveries of heavy plate were begun.

The company's fleet totalled 32 vessels, aggregating 546,000 tons d.w. at the end of 1960. A combined ore carrier/tanker of 14,200 tons was delivered early this year, while a further four ships, totalling about 100,000 tons, are on order for delivery in 1962-63.

New Literature

READERS wishing to obtain a copy of any of the house magazines, catalogues, booklets, and other publications referred to below should write direct to the address given, at the same time mentioning this journal.

MARTONAIR, LIMITED, Parkshot, Richmond (Surrey)—Articles on "Mine-car Loading," "Welding," "Coil Winding," and other subjects are included in the latest number (Vol. 4, No. 29) of the Journal of Applied Pneumatics (1s. 6d.).

EDGAR ALLEN & COMPANY, LIMITED, Imperial Steel Works, Sheffield 9—Fourth and fifth sections of the article on "The Machining of Steel," by Dr. F. C. Lea and Eric N. Simons, in the September issue of the Edgar Allen News, are concerned with milling practice and drilling practice.

LANCASHIRE DYNAMO & CRYPTO, LIMITED, Trafford Park, Manchester 17—The "Crypto-D" motor is the subject of leaflet SL.2. This range of totally enclosed fan-cooled cage rotor motors offers outputs comparatively higher than those of other motors manufactured in this country. They are suited for all applications with outstanding advantages where smaller, lighter motors are desirable and where rotor inertia is so important.

ASSOCIATION OF BRONZE AND BRASS FOUNDERS, 69, Harborne Road, Edgbaston, Birmingham 15—In its campaign of market development the association's theme for this year is "Design Now for the Future with Copper Alloy Castings." With the above theme, the association will have a stand at the Engineering Materials and Design Exhibition, to be held in London in November. More about this is contained in the May-July issue of the association's bulletin (issued to member firms only).

PYRENE COMPANY, LIMITED, Great West Road, Brentford (Middx)—"Parkerizing Rustproofiing Processes" is the title of a new leaflet issued by the company's metal finishing division. Parkerizing, a two-stage rustproofing process applied by immersion, consists of converting the ferrous metal surface into a non-metallic crystalline phosphate coating which is integral with the base metal. This highly absorbent film is then impregnated with a suitable finishing medium, thus providing a good corrosion resistant surface.

HENRY WIGGIN & COMPANY, LIMITED, Thames House, Millbank, London, S.W.1—The latest (No. 62) edition of Wiggin Nickel Alloys reviews applications of Wiggin high-nickel alloys in many of their specialized fields of application and its emphasis is on high-temperature materials specifically in the gas-turbine engine. The magazine also includes articles as diversant as the X15 hypersonic aeroplane and the corrosion-resistance of nickel/chromium plating, flexible expansion joints in Inconel alloy, and boatbuilding using Monel alloy fasteners.

STANTON IRONWORKS COMPANY, LIMITED, near Nottingham—Known as the "Birmingham" of Canada, Hamilton (Ontario) is the town chosen as the home of the first spun-iron pipe plant of Stanton Pipes (Canada), Limited. Among the industries of Hamilton are iron, steel, textiles, and fruit growing. A photograph in colour of the town provides the front cover of the August number of the Stantonian (1d.). The new plant, officially opened in June by the Hon. Ellen H. Fairclough, Canadian Minister of Citizenship and Immigration, is described in the issue.

POWELL DUFFRYN, LIMITED, Boundary House, 7-17, Jewry Street, London, E.C.3—"Night Scene at Helsinki" is the caption to a striking photograph in colour on the front cover of the summer number of the P.D. Review. Finland is, in fact, the country dealt with in the "Around the World with PD" feature in this issue. The article traces the historical background of the country and also gives an interesting picture of the economic and industrial side of the nation. Other features concern group activities and topics of general interest.

THOS. FIRTH & JOHN BROWN, LIMITED, P.O. Box 114, Atlas Works, Sheffield 4—"Firth Brown Works and Products" (publication No. 234) has been designed to provide a general description of the company's historical background, manufacturing facilities, and range of products. The company has developed in the course of more than a century from separate small beginnings on adjacent sites to the present large, single undertaking. The works, comprising open-hearth and electric melting furnaces, press and hammer forges, rolling mills, heat-treatment plant, and machine shops, specialize in the production of an extensive range of forgings and rolled products in high-grade carbon and alloy steels. Steel castings, formerly made at these works, are now produced in the company's Scunthorpe foundry and dropforgings at the works of the subsidiary, Firth-Derihon Stampings, Limited. From the long list of some events in the history of the company we find that it is just 100 years ago that John Brown & Company produced a 5-ton armour plate by rolling. The company was placed on the Admiralty list in the same year. The new booklet is an excellent guide to the activities of Thos. Firth & John Brown and its subsidiaries.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.1—The world's first reheat steam turbines for commercial operation were made by AEI and installed in the North Tees power station, completed in 1920. Since that time there has been a steady increase in inlet pressure and temperature conditions with a corresponding increase in the standard sizes of turbine-generator sets. A curve connecting the present improvement in thermal efficiency with unit size and steam conditions shows, however, that the practical limit has almost been reached for sub-critical pressure and single reheat units. In "Development in Reheat Steam Turbines," an article in the September number of AEI Engineering, J. C. London points to the problems of design and manufacture which will have to be overcome in the more advanced machines of the future. J. R. Barratt, electrical new construction engineer, Steel, Peech & Tozer (branch of the United Steel Companies, Limited), and T. E. Barany, plant application development engineer, AEI heavy plant division, are the joint authors of "Logicon Static Switching." A brief description of the principles of static switching and of the basic units used are given at the beginning of the article, which then describes the successful application of the Logicon system to the control of a steel mill flying shear.

IMPERIAL CHEMICAL INDUSTRIES, LIMITED, Imperial Chemical House, Millbank, London, S.W.1—The Nobel Division of ICI has published a new edition of its publication "Plastic Igniter Cord." This is a rather

more comprehensive edition than the first in that it now covers not only the use of plastic igniter cord in quarries, but also in metalliferous mines. In quarrying and open-cast mining plastic igniter cord is mainly used for secondary blasting. With the aid of plastic igniter cord it is now possible to light large numbers of pop and plaster shots without the necessity for scrambling over rock piles, and the shotfirer can be certain of being in a safe place before any of the shots detonate. In metalliferous mining, plastic igniter cord is equally highly successful in all kinds of stope blasting and in development work. In these operations it provides, in addition, a reliable means of achieving correct sequence firing simply by using the same length of safety fuse in each shothole and connecting the shots in the correct order with a suitable length of slow igniter cord.

FORTHCOMING EVENTS

SEPTEMBER 19-21

Combustion Engineering Association:—Display of coal and ash handling equipment at Salford British Railways Yard.

SEPTEMBER 20

North Wales Metallurgical Society:—Meeting at Flintshire Technical College, Connah's Quay, near Chester, at 7 p.m. "Recent Developments in Steelmaking Techniques with Special Reference to the Brymbo Oxygen/Electric Process," by Emrys Davies, Brymbo Steel Works, Limited.

Mining Institute of Scotland:—Meeting at the Royal College of Science and Technology, George Street, Glasgow, C.1, at 5.15 p.m. "Operational Research and its Application in the UK Coal Industry," by Dr. B. T. Houlden, head of the field investigation group, scientific department, National Coal Board.

SEPTEMBER 21

Institution of Plant Engineers (Blackburn Branch):—Joint meeting with the North-Western Section, Institute of Fuel, at the Castle Hotel, Blackburn, at 7.30 p.m. "Shell Boiler Developments," by A. D. C. Gunn.

SEPTEMBER 25

Institution of Plant Engineers (West and East Yorkshire Branch):—Meeting at the Houldsworth School of Applied Science, University of Leeds, at 7.30 p.m. "Construction of Bradwell Heat Exchangers," by J. Shaw and G. Cain.

SEPTEMBER 26

Combustion Engineering Association (North Western Region):—Visit to Fibreglass, Limited, St. Helens (Lancs).

Society of Instrument Technology:—Meeting at Manson House, 26, Portland Place, London, W.1, at 7 p.m. "Underground Gasification of Coal—Some Features of Instrumentation," by Dr. A. E. Balfour, and "Trends in Mining Instrumentation," by A. E. Bennett.

Institution of Plant Engineers (South Wales Branch):—Meeting at the South Wales Institute of Engineers, Park Place, Cardiff, at 7.30 p.m. "Industrial Use of Gas," by W. H. Tarn.

Institution of Mechanical Engineers (Scottish Branch):—Meeting at the Pentland Hotel, Thurso, at 7.30 p.m. "Fluid Power Transmission with Particular Reference to Hydrostatic Transmission," by D. Firth.

SEPTEMBER 28

Midland Counties Institution of Engineers:—Annual dinner and dance at the Sherwood Rooms, Greyfriar Gate, Nottingham, at 7 p.m.

Institution of Plant Engineers (Merseyside and North Wales Branch):—Meeting at the Exchange Hotel, Liverpool, at 7.15 p.m. "The Natural Ventilation of Industrial Buildings," by F. E. Grandidge.

Institution of Plant Engineers (Sheffield Branch):—Meeting at the Grand Hotel, Sheffield, at 7.30 p.m. "Industrial Relations," by W. Carron, president, Amalgamated Engineering Union.

Institution of Mechanical Engineers (Scottish Branch):—Meeting at the Royal College of Science and Technology, Glasgow, at 7.30 p.m. "Fluid Power Transmission with Particular Reference to Hydrostatic Transmission," by D. Firth.

National Association of Colliery Managers

SEPTEMBER 27

Lancashire Branch:—Meeting at the Manchester Literary and Philosophical Society, 36, George Street, Manchester, at 4 p.m. Presidential address.

Book Review

Cyclones in Industry. Edited by K. Rietma and C. G. Verver. Elsevier Publishing Company, 358, Kensington High Street, London, W.14. Price 53s.

THIS is a collection of papers on the principles and utilization of industrial cyclones, originally presented at two symposia on this subject organized in 1953 and 1958 by the Royal Dutch Institute of Engineers and the Royal Netherlands Chemical Society.

In a foreword the authors point out that the industrial cyclone is an apparatus that has acquired a unique position among the various forms of equipment available in the design of an installation for a chemical or process plant. This is due to its simplicity of construction, its lack of moving parts, its large capacity, and its many applications. Today it is rare to find a factory carrying out a chemical or physical process in which a gas cyclone does not figure, whether for the collection of dust or for the the purification of air contaminated with a mist of liquid particles. The hydrocyclone is now a completely indispensable component in numerous process industries such as those concerned with coal-washing and the treatment of ores.

The widespread use of the cyclone, the authors declare, has become established in spite of certain drawbacks that it inevitably must possess alongside its many advantages. These disabilities include the fact, probably little appreciated by many users, that a cyclone cannot always be scaled up without reducing its efficiency, in which case an increase in capactiy has to be achieved by connecting a number of cyclones in parallel. Usually, also a cyclone causes a considerable drop in pressure. Moreover, due to such factors, the design of a cycle is a highly critical business generally reserved for specialists, "particularly since the general know-how is usually kept secret by the manufacturers of the apparatus." In the Netherlands, it is claimed, there are a number of industries and consultants that have been engaged in the development of the cyclone and its applications leading to the build-up of an international reputation.

There are 11 chapters by various authors dealing with different aspects of cyclone applications. These include:—(*a*) General remarks on phase separations and classification; (*b*) efficiency of phase separations; (*c*) flow phenomena in cyclones; (*d*) mechanism of the separation of finely dispersed solids in cyclones; (*e*) influence of the Reynolds numbers on the operation of a hydrocyclone; (*f*) linking cyclones in series and its effect on total separation; (*g*) the separation of liquids from gases in cyclones; (*h*) separation of dust from gas; (*i*) separation of emulsions in a cyclone; (*j*) separation by cyclone according to specific gravity; (*k*) separation of barytes and clay in drilling muds by means of hydrocyclone.

The final chapter is the chairman's summary after the second symposium on cyclones at Utrecht in December, 1958. The value of this work is enhanced by the fact that no other book or treatise specially devoted to cyclones has so far appeared in the technical literature of any country.

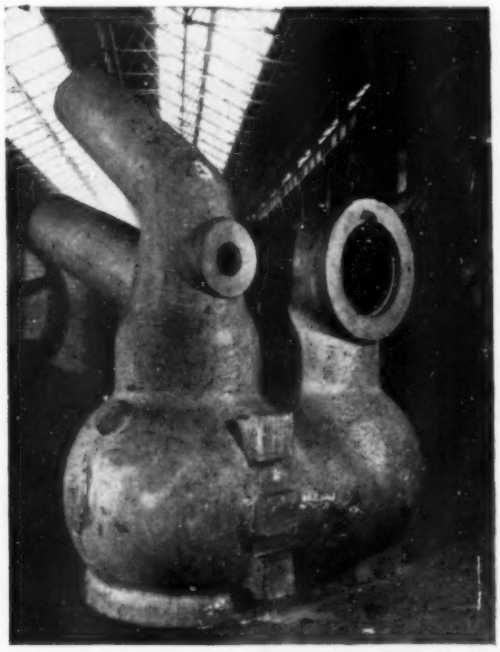
THE VENEZUELAN Ministry of Mines has stated that the iron-ore deposits at San Isidro, Las Pailas, and San Joaquín amount to 600,000,000 tons and have an average Fe content of 63 per cent. A study is to be made of Las Barrancas deposits, which are estimated to contain between 400,000,000 and 500,000,000 tons of ore.

INTERESTING CASTING OPERATION

TWO sets of intercept steam chests for the West Thurrock 300-MW turbine generator installation were ordered by AEI, Limited, from the steel casting division at Jarrow of Armstrong Whitworth (Metal Industries), Limited. The first of these left-hand and right-hand sets has just been completed and provides an interesting example of quality casting.

The basic specification of the steam chests calls for molybdenum vanadium high-temperature steels for operation at pressures of 700 lb./sq. in. at temperatures of 1,050 deg. F.

The original design of the branch ends contained thickened end sections to allow for machining so that a blanking plate could be mounted for pressure testing of the castings. This produced the problem of flaws due to centre-line shrinkage caused by the irregular proportions. The possibility of leakage around the studs on which the blanking-off plate was mounted and difficulties in subsequent welding arose. The final design eliminated the thickened ends and included a tapered wall thickness of 2¼ in. to 1½ in. at the extremity to assist directional solidification. The casting was pressure tested without the need for studs, and after testing, was machined to the original drawing dimensions to allow welding to the next section of the turbine installation.



ONE OF THE INTERCEPT STEAM CHESTS CAST FOR AEI BY ARMSTRONG WHITWORTH (METAL INDUSTRIES), LIMITED. THE PHOTOGRAPH SHOWS THE 6-IN. HOLE INCORPORATED IN FINAL DESIGNS BY WHICH IT WAS POSSIBLE TO INSERT CORE SUPPORTS FOR THE TWO BRANCH ENDS (LEFT) AND THUS AVOID THE USE OF CHAPLETS.

The possibility of disturbance in the flow of steel around the conventional chaplets used to support the cores, and the prospect of incomplete fusion, led to redesign to incorporate a 6-in. dia. hole at the neck of the two branch pipes. This permitted support of the loop pipe branch core by means of a bolted tie-bar—a method which not only avoided metallurgical difficulties, but which provided a more secure method of preventing movement of the core. The facing of this hole will be subsequently machined and a cover plate bolted to the casting.

The original provision for integral casting of the brackets by which the chests are handled and mounted has been discarded because of the danger of cracking and unsoundness. The castings now include a simple pad on which the mounting brackets will subsequently be bolted.

Tasmanian Steel Proposals

ARRANGEMENTS have been made for 20 tons of Savage river iron ore and a trial parcel of Tasmanian coal to be tested in the United States for steelmaking. An exploration licence has been granted to Mr. E. R. Hudson, and if the tests are satisfactory, a new company will be formed to assess the complete economies of the Tasmanian iron-ore deposits. This will include diamond drilling of all potential iron-ore deposits, an economic survey of metallurgical processes, transport costs, and selection of plant site.

Industrial & Mining Investigations Pty., Limited, has been formed to arrange preliminary investigations. Mr. Hudson is managing director of Queensland Mines Pty., Limited, and chairman of Kathleen Investments, Limited. His company is primarily interested in producing steel in Tasmania.

He is arranging to investigate the economies of exporting iron ore from the Blythe river if the Blythe river deposit cannot be used in conjunction with the Savage river deposit for production of steel in Tasmania.

Mr. Reece, Premier of Tasmania, has stated that the exploration licence granted to Mr. Hudson was subject to the condition that he begin immediate investigation work. It had been provided also that Mr. Hudson should proceed to incorporate a public company to be known as Tasmania Steel Investigations, Limited, with a paid-up capital of £1,000,000 to make the investigations.

THE FRENCH Forges et Ateliers du Creusot is to install a new four-high heavy plate mill.

Mining Oversea

in which we review, from time to time, interesting mining matters reported by our contemporaries abroad

POWERED ROOF SUPPORTS IN BELGIUM

FOLLOWING a study tour by Belgian mining engineers of British collieries, the decision has been made to equip an experimental coal face at the Andre Dumond Colliery in Waterschei with the goal-post type of support made by A. G. Wild & Company, Limited, Sheffield 2. Tests with powered coal-face support of the type Westfalia began at the Beeringen Colliery on February 12, 1960, and it is expected that this branch of mechanization will expand very quickly.—Annales des Mines de Belgique, February, 1961.

CUTTER FOR MACHINE STABLES

PREPARATION of stables at the ends of a mechanized coal face is usually a bottleneck in the operation. At the Grimberg Colliery in the Ruhr it was decided to construct stable cutters in the workshops from the driveheads and motors taken from standard coal cutters. The depth of cut is 5 ft. and the stable length 30 ft. (Fig. 1). Before the introduction of coal cutters, four miners and one shotfirer were required to prepare each stable, drilling 14 shots in two rounds. One stable can now be undercut in 2 hr. and two miners and the shotfirer are now unnecessary.—W. BAST, Glückauf, July 16, 1960.

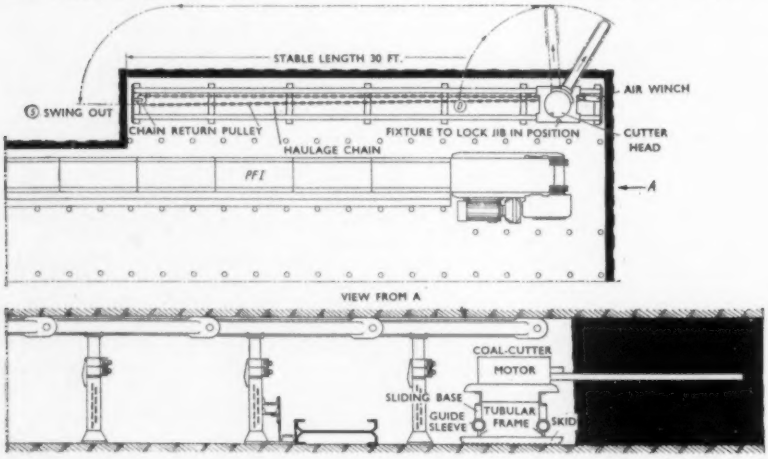


FIG. 1.—DETAILS OF THE STABLE CUTTER DESIGNED AT GRIMBERG COLLIERY.

EXPLOSION HAZARDS

TESTS with local coals by the East German Testing Station at Freiberg have confirmed that the lower explosibility limit of 112 grains/cu. ft. of a dust with 32 per cent. in the under 60-micron size range, fell to 19 grains/cu. ft. when 91 per cent. of the coal was below 60 micron. Stone-dust barriers must contain at least 80 lb. of stone dust/sq. ft. of cross-sectional area in the case of a major barrier and 16 lb./sq. ft. for a branch barrier. Comparative tests were also carried out with stone-dust barriers and water troughs, either with the units close together (five of each, 10 ft. apart) or at distances of 100 ft.

If the stone dust had a good dispersability, both types were equally effective except that the water troughs were better when the explosion had a longer period of initiation. The longer the period, the more water or stone dust was, however, necessary to extinguish the flames. Particularly efficient were barriers which happened to be 100 to 400 ft. away from the starting point of an explosion. When the start did not exceed 300 ft., the distributed units acted particularly well.—H. HANEL, Bergbautechnik, March, 1961.

PROBABLE DEVELOPMENT OF THE IRON AND STEEL INDUSTRY IN THE LORRAINE

STEEL output of the Lorraine is expected to rise from 14,500,000 tons in 1958 to between 25,000,000 and 30,000,000 tons by 1975. In reviewing ability of the Lorraine to compete on the world markets, it is thought that its labour cost will not differ substantially from those of other nations. The only elements which would have a differential effect on the cost per ton of steel delivered to the customer appear to be the value of the raw material consumed per ton, the ratio of the weight of finished steel to that of the raw material, and the transport charges.

These items are called the "determinant values" for the competitive position of any iron and steel industry and they constitute the only variables through which the costs can be varied. The raw material (iron ore) price tends to fall over the years and the Lorraine will be able to meet this reduction. The reserves of the Lorraine mines, which have supplied 75 per cent. of the requirements of the French iron and steel industry in the past would, however, lead to an exhaustion in 40 years, should an ore production of

100,000,000 tons per annum become necessary for the doubled steel production in 1975. The alternatives to rapid exhaustion are much more opencast workings or a partial substitution of foreign iron ore and compensation of its higher costs by economies in operation and in price of coke.

Transport is the worst problem for the Lorraine iron and steel industry and the development of navigable waterways, particularly of the Moselle, would result in considerable savings. The French iron and steel companies will be faced with the choice between expansion or reduction of the steel output in 20 to 30 years' time.—M. EPRON, Revue de l'Industrie Minerale, March, 1961.

NEW SLURRY PUMPS

NEW slurry pumps have been designed by the Klöckner-Humboldt works of Cologne especially for the requirements of coal-preparation plants.

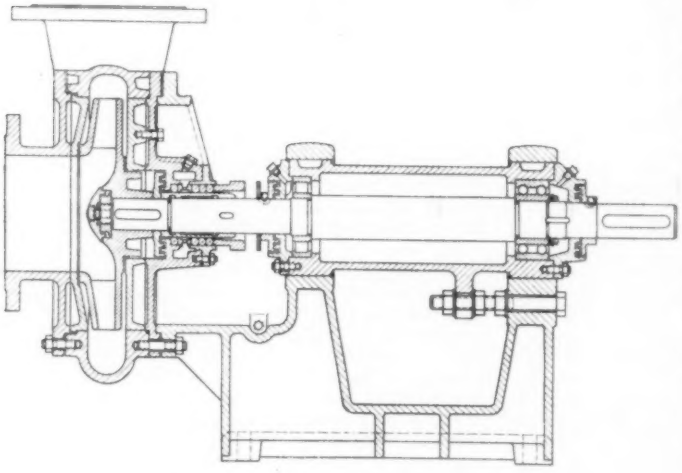


FIG. 2.—SECTIONAL VIEW OF A NEW GERMAN SLURRY PUMP.

Particular care has been taken to combine the efficiency of a spiral casing with good wear resistance in the pump shown in Fig. 2.

To protect both the suction cover and the sealing gland cover, easily exchangeable wear plates, made from the same wear resistant material as the impeller, are fitted on either side. The sealing gland is flushed by fresh water. No paddles are arranged at the rear of the impeller to relieve the sealing gland because they are considered to cause wear of all internal parts. Instead, multi-stage labyrinth seal has been added.

The pump shaft itself has a wear resistant and easily exchangeable sleeve where it passes through the sealing gland. For connection to up to 10-in. dia. pipes, these pumps are available in the single-suction version and at a speed of 1,450 r.p.m., while beyond this diameter the pumps are of the double-suction type and rotate at 960 r.p.m.—H. WERNER, Glückauf, April 12, 1961.

VENTILATION SURVEYS AND HORIZON MINING

VENTILATION surveys at Meilebach Colliery are carried out by three teams—the marker team, which has to place the measuring stations underground and to establish in detail the instructions to be given to other teams, the photo-profile team, entrusted with recording of cross-sectional areas, and the measurement team, which takes readings of quantity flowing and pressure. The team leader selects the measurement section in the vicinity of the bench-mark placed by the marker team. This section is marked with chalk along the arch or the roadway wall. The camera is then set up, the photo-profile lighted in the plane selected, and the photograph is taken. The organization of the measurement team depends on whether the work involves horizontal elements, non-horizontal elements, or districts. In the case of horizontal elements, the team is split into two sections, one for measuring the differential pressures and one for measuring the flow rates. The flow-rate section keeps, in particular, a record of the following information:—Number of the station; type of roof support; direction of flow, and a sketch illustrating the position of any pipes and belt conveyors. The flow-rate team is engaged both in measuring the flow rates, the absolute pressures and the temperatures.

In the case of non-horizontal elements (principally staple shafts and main shafts), the team is divided into two subteams which carry out all the operations, but they work separately at each horizon. Communication between them is by telephone.—E. SIMODE, Revue de l'Industrie Minerale, April, 1961.

Height and Design of New Chimneys

Main recommendations of a Working Party appointed in November, 1958, by the Air Pollution Panel of the Federation of British Industries to make recommendations on the height of new chimneys with particular reference to Section 10 of the Clean Air Act are contained in a new handbook. They refer to industrial boiler plants with an output of 5,000-33,000 lb./hr. steam at maximum continuous rating. Recommendations are also made in respect of larger plants up to an aggregate steam capacity of 450,000 lb./hr. None of the recommendations mentions washed gas effluents. It is also recommended that a Working Party should make a survey early in 1963 of the conditions around new chimneys built to these recommendations to check whether any modifications to the proposals are desirable. Copies of the handbook—"Height and Design of New Chimneys"—are obtainable from FBI Print & Publications, 21, Tothill Street, London, S.W.1, price 4s., post free.

Safety Device for Slowbanker

MR. G. M. MAYO, of the National Coal Board's Durham Division, has devised a "tell-tale" scheme for shadowing the Worsley Mesnes slowbankers to ensure complete safety when riding men. Its function is to bring the winder to a standstill before the cage approaches the landing level in the event of the piston not following its normal movement.

In the drawing (Fig. 1) travelling nuts 4 and 5 represent the cages positioned outside the slowbanker range. Proving switches 6 and 7 and piston switch 8 are all normally closed, maintaining energized the d.c. emergency solenoid 10. As the cages approach the landing or bank level one of the travelling nuts sweeps past a proving switch which is momentarily opened for a period of half a drum revolution before entering the slowbanker acceleration or deceleration range.

On entering the slowbanker range the proving switches reclose and switch 8 opens as the piston 2 is raised for controlling acceleration and deceleration periods. The d.c. emergency solenoid is maintained energized by means of the proving switches.

In the event of the piston 2 sticking at any point of its travel, switch 8 remains open. As soon as the travelling nuts sweep past the proving switches the d.c. emergency solenoid is de-energized, allowing the 7-lb. weight 9 to drop on to the extension arm 11, thus bringing into action the slowbanker tripping mechanism, cutting off the steam, applying brakes, and bringing the winder drum to a standstill. The extension arm is made of ¾-in. by ¼-in. mild steel in order to maintain the balance of the existing tripping arm 12.

Warning lights are incorporated in the scheme.

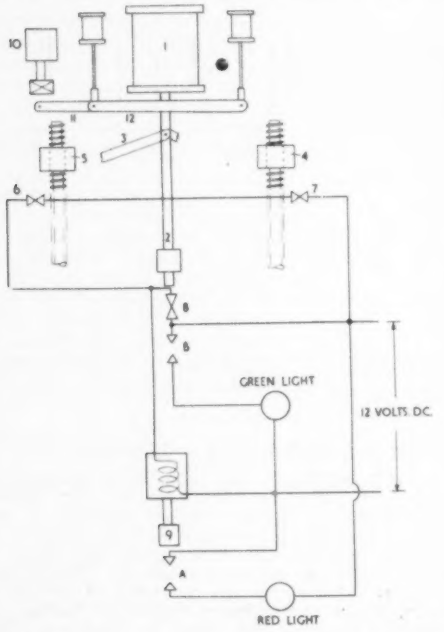


FIG. 1.—ELECTRICAL LAYOUT OF "TELL-TALE" SCHEME FOR SHADOWING THE WORSLEY MESNES SLOWBANKER DURING ACCELERATION AND DECELERATION PERIODS.

1.—Main cylinder. 2.—Piston rod. 3.—Piston operating links. 4.—Travelling nut. 5.—Travelling nut. 6.—Proving switch. 7.—Proving switch. 8.—Piston switch. 9.—7-lb. tripping weight. 10.—D.c. emergency solenoid. 11.—Extension arm. 12.—Tripping arm. A.—Switch for indicating light. B.—Switch for indicating light.

USE OF WATER POWER IN MINES

IN perfecting water-infusion techniques for dust-suppression purposes, French mining engineers of the Béthune collieries have also found auxiliary uses for high-pressure water produced by double-acting booster pumps. This additional source of power, obtained by tapping the high-pressure infusion range from gate roadways to the face, is being used for pusher rams, hydraulic setting devices, and extractor jacks for withdrawing props at faces with bad roof conditions.

An article in the June issue of Revue de l'Industrie Minerale, by J. J. Walter, outlines some of the auxiliary uses of the high-pressure water.

A hydraulic setting device has been developed to tighten friction props used in thin seams of 2 ft. working thickness. The water-operated device, which has a clamping force of 5 tons, is being used to replace a hand-operated unit which has a very irregular tightening action. The hydraulic prop setter can be used up to working thicknesses of 3 ft. and, because of the good results being obtained, it is being adapted for thicker seams. Although a saving of time of 20 per cent. had been observed compared with the hand-operated model, its principal advantage is considered to be in improved roof control.

Further developments include a hydraulic prop-withdrawing device, exerting a force of 8,265 lb., and a machine for salvaging arches from old gate roadways. The salvaging machine, weighing 2,645 lb., enables the roadway supports to be withdrawn with a saving in cost of 33 per cent. compared with previous methods and allows more complete withdrawal in difficult roof conditions.

THE BSI HAS PUBLISHED another set of reference tables for the purpose of converting thermocouple voltages into equivalent temperatures. The new tables are published as BS1828: "Reference Tables for Thermocouples (Copper *v.* Constantan)." Copies may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1 (price 6s., plus postage).

Errors in Control of

GAS FLOW AND DISTRIBUTION OF MATERIALS IN THE BLAST FURNACE

Unusual views on the relation between gas flow and distribution of the materials in the blast furnace are propounded by the authors, A. N. Chechuro and I. L. Kolesnik, of this paper, translated from Metallurg, 1960, V, No. 8, pp. 7-8. The authors are at the Dzerzhinsk Works. When publishing the paper, the editor of Metallurg requested blast-furnacemen to express their views on the method of controlling the running of a furnace "from the top," as proposed in the article. The Metallurgical Editor of IRON AND COAL *would also like to receive comments from readers.*

UP to the present time, for control of the gas flow in a blast furnace, and when changing the distribution of materials in the throat, blast-furnacemen have been guided by the temperature of the peripheral gases, by analysis of the gas along a radius of the furnace, by the temperature of the gas in the gas offtakes, by the descent of the charge on the basis of stockline indicator diagrams, and by the top gas pressure.

The opinion has been current that when there is a high temperature on the peripheral gases at all points in a blast furnace, there is peripheral flow of the gases, but that where the temperature at the periphery is low, the periphery of a blast furnace takes the bulk of the burden, and a central gas flow is developed.

On these considerations the charging sequence has been altered in the first instance in the direction of increasing the burden fed to the periphery (ore-coke), and in the second instance towards lightening the burden fed to the periphery (coke-ore).

In those instances where the temperature of the periphery at one or several points rose by comparison with the temperature of the remaining points by 150 to 200 deg. C., it was considered that a channel had been formed in the blast furnace on the side of the high peripheral temperatures. The charging sequence and programme of the revolving distributor were changed so that the bulk of the ore passed towards the high-temperature side, and the coke towards the low-temperature side, of the furnace.

Results of Detailed Study

During a detailed study of the operation of blast furnaces we have established and confirmed in practice that existing impressions of the gas flow and of the distribution of the materials in the throat are completely opposed to what in fact takes place. Analysis of our work and preliminary investigations to determine the state of the gas flow and to study control of the distribution of the materials in the throat show that *the lowest temperature of the peripheral gases is at the point where the flow of gases and materials attains its maximum intensity, and the highest temperature at the point where the charge ceases to move, or moves only slowly downwards.*

The low temperature of the peripheral gases in the area of their intensive flow is explained by the aerating action of the gas flow and the rapid downward movement of the charge. In its turn, in the area where the materials are aerated, the flow rate of the gases becomes even higher, and the rate of downward movement of the charge is increased to an even greater extent, which improves the utilization of the heat energy of the gas.

For instance, in one of the blast furnaces at our works, on March 25, 1960, during the second shift, the top pressure was raised from 0.8 to 1.2 atm. without increasing the blast consumption. After two shifts the temperature of the periphery fell from 750 to 550 deg. C. The foreman of the first shift, guided by existing concepts, changed the charging sequence from coke-ore-ore-coke to coke-coke-ore-ore to open up the periphery. In consequence, the temperature of the peripheral gases did not rise, but, on the contrary, fell to 500 deg., and at point No. 3 even to 400 deg. C In the second shift on March 26 the sequence was changed to coke-ore-ore-coke. The temperature of the periphery started to rise, but did not attain the required level. In order to raise the temperature, the charging sequence was changed to ore-ore-coke-coke, and the programme of the revolving distributor was set in such a way as to raise the temperature of point No. 3 to the level of the others. After six fillings the temperature of the periphery at point No. 3 and at all the remaining points went up to the required level, but after replacement of the ore-ore-coke-coke charging

sequence by the ordinary sequence, and a return to the normal operation of the revolving distributor, the temperature of the periphery again started to fall. In order to increase the temperature of the periphery the following charging sequence was started—two fillings of ore-ore-coke-coke and five fillings of coke-ore-ore-coke. After this the temperature of the periphery rose to 700 deg. C., the furnace started to run more evenly, and the temperature of point No. 3 equalized itself with all the rest.

A very high temperature of the peripheral gases in a blast furnace is explained by hanging or a very slow downward movement of the charge, in consequence of which the temperature of the periphery rises due to poor utilization of the heat energy of the gas. From March 5, 1960, for instance, in a second blast furnace for a period of over two weeks, the temperature of the periphery at points 1 and 2 was consistently within the limits of 900 to 920 deg. C., but at all the remaining points was 570 to 650 deg. C. On changing the charging sequence and the programme of the revolving distributor in accordance with the normally accepted concepts, it proved impossible to equalize the flow of gases at the periphery of the blast furnace, and it was only after coke had been charged to the high-temperature points, and ore to the low-temperature points, that equalization of the temperatures of the peripheral gases took place, when the furnace started to operate normally.

In another furnace, in which a radiometric instrument was used for measurement of the stockline level at four points, the following phenomenon was observed: at the points on the periphery with a high temperature the stockline level was too high, while in areas with a low temperature of the periphery the furnace was not filled to the required level.

From the considerations presented it follows that a low temperature of the peripheral gases expresses a sharply pronounced downward movement of the charge at the periphery in consequence of the fuller delivery of the physical energy of the gas to the rapid countercurrent flow of fresh materials entering the furnace.

A high temperature at the periphery expresses the development of a central flow of the gases and bad utilization of the physical energy of the gas rising at the periphery.

Charging Cycles Adopted

In order to control the flow of gas we have adopted the following charging cycles: for raising the temperature of the periphery ore-coke, and for lowering this temperature coke-ore (*i.e.*, we have taken measures in direct contradiction of the established working cycle). On changing the charging cycle special attention should be given to the extent of the development of a central flow of the gases and the depth of the funnel in the materials in the throat.

On the development of a channel within a blast furnace, the charging sequence and the programme of the revolving distributor should be chosen so that the bulk of the ore shall fall towards the side with the lowest peripheral temperature, and coke towards the side with the highest temperature.

Evidence of the rapid progress of the raw materials through the zone of intense gas flow is also provided by the fact that within the course of 3 to 4 hr. after the start of the formation of a channel, in the area of the blast tuyeres in this sector lump material appears which has not been suitably prepared for fusion. The measures adopted for the removal of a channel in accordance with our method make it possible rapidly to eliminate the occurrence of these lumps.

Correction of the running of blast furnaces by the method described has been carried out over a period of two months in the four blast furnaces at the Dzerzhinsk Works.

NEW PROCESS FINNED TUBE FOR NUCLEAR POWER STATION

OVER 600,000 ft. of welded finned tube made by a new process is to be supplied by the Extended Surface Tube Company, Limited, Birmingham, for use in the boilers of Dungeness nuclear power station. The company is jointly owned by Imperial Chemical Industries, Limited, and Stewarts and Lloyds, Limited, and the finning machines used for the order were designed and manufactured by Stewarts and Lloyds at Corby.

In the new process, using welding current generators among the most powerful of their type, cold-rolled strip is welded to the tube as it is helically wound on to form the fin. As a result of strict control, a weld bead is produced which is small and consistent in quality and allows more fins per inch. Up to seven fins per inch are accepted as standard, probably the highest number ever produced in welded fin tube.

Industrial Results in Bulgaria

FIGURES released by the Central Bureau of Statistics of the People's Republic of Bulgaria show that the production plan for industry was exceeded by 6.1 per cent. during the first half of this year. The value of this excess output is estimated at 1,387,000,000 leva (about £69,350,000) and exceeded that of the first half of last year by 11.9 per cent., or 2,373,000,000 leva (about £118,650,000), valued in each case in terms of the prices current on January 1, 1960.

Production as percentage of that planned (with the percentage of that of the first half of 1960 in parentheses) was:—Fuel, 104.1 (103.7); iron and steel (including ore mining), 87.0 (116.0); non-ferrous metals (including ore mining), 98.8 (110.5), engineering, 100.8 (115.1). Actual output (in tons) (with output as percentage of that of the first half of 1960 in parentheses) was:—Coal, 8,904,000 (107); pig-iron, 74,000 (134); ingot steel, 168,000 (141); rolled steel products, 138,000 (141).

UNDER A three-year trade agreement between Sweden and Poland, signed for the period ending April 30, 1964, Swedish exports to Poland will include iron and steel products and 600,000 tons of iron ore per year.

Coal Production in India's Third Plan

COMPULSORY AMALGAMATION OF COLLIERIES

SHARE of the private sector of the additional quantity of coal to be produced in the Third Five-year Plan in India has been fixed at 17,000,000 tons and the collieries in the public sector (National Coal Development Corporation and Singareni collieries) are required to produce the balance of 20,000,000 tons. The Planning Commission has, however, said that the allocation of the additional production to the two sectors is not to be considered as rigid. The progress of the programmes will be kept constantly under review, as the total production in the Second Plan period was not achieved.

In 1960-61 the production of coal was 54,620,000 tons, although, according to the Second Plan target, it should have been 60,000,000 tons. The shortfall was accounted for wholly by the collieries in the public sector. During the Second Plan, the contribution of the private sector to the additional production came from existing mines, whereas the major portion of the additional production in the public sector was from new mines.

New Mines to be Opened

The increase planned for the Third Plan is so large that it will necessitate the opening of a number of new mines, especially in the public sector. The major portion of the contribution of the private sector (11,000,000 tons out of 17,000,000 tons) will come from the existing mines and the balance from new sinkings in existing leasehold areas.

It has been decided to introduce legislation for the compulsory amalgamation of collieries with a view to increasing coal production, but this legislation has been postponed until about the middle of the Third Plan period. The committee on the amalgamation of small collieries has so far approved 31 cases of voluntary amalgamation.

Raising coal production from the present 60,000,000 tons a year to 97,000,000 tons a year by 1966—the end of the Third Plan—is expected to call for a great deal of effort and capital investment, especially in the public sector.

The most important objective of the coal programme in the Third Plan is to ensure that the necessary quantities of coking and blendable coals are made available to the steel plants and other coke-oven plants, and of superior grades of non-coking coal to the railways and other industries.

The concentration of coal production in the Bengal-Bihar coalfields is said to pose serious problems of transport as consumers of coal are distributed all over India. For some years now the Railway Board has been urging the development of outlying coalfields, especially those of Central India, which would reduce the pressure on rail movement from the Bengal-Bihar fields.

The coupon system for the movement of coal came into effect throughout India on July 24, except in the States of Assam and Andhra Pradesh, where grading of coal has not as yet been made. The coupon system replaces the road permits and passes formerly required for despatching coal. Under the new system, collieries raising Grade 2 coal and below will be allowed to despatch such coal to consumers on furnishing the necessary particulars prescribed on the coupons issued to them. It has been decided to move soft coke also under the coupon system.

Under the new arrangement collieries will be allowed to despatch coal by road or river up to the permissible limits fixed for it.

Use of Road Trucks

The transport of coal by means of road trucks has been suggested by Mr. B. Agarwala, president of the Indian Mining Federation. The suggestion was made at a joint meeting of the Indian Mining Federation and the Indian Colliery Owners' Association. Mr. Agarwala felt that his proposal would solve the present problem of the movement of coal. He said adequate rail transport for all varieties of coal might not be feasible in view of the growing demand for high-grade coal, which would absorb the available transport.

Meanwhile, Mr. Jagjivan Ram, Railway Minister, Government of India, told representatives of the coal industry that the transport capacity of the railways was not proving adequate now to cope with the country's needs due to wagon shortage. He assured, however, that the railways would be able to remove more coal by November this year to reduce the pithead stocks.

But the movement of coal on the railways is again causing some concern, with complaints of accumulating pithead stocks and insufficient supply of wagons to collieries. Arrangements for moving a larger quantity of coal by sea from Calcutta to ports in the south and on the west coast are not as

yet going according to plan owing to the number of ships plying for the purpose being insufficient.

Officials of the Railway Board as well as the Railway Minister have been hearing representations from the trade in the Begal-Bihar coal-mining areas, and the board hopes to take advantage of the current slack season in trade to bring down pithead coal stocks from 5,000,000 tons to less than 3,000,000 tons.

A pithead stock of 2,000,000 to 2,500,000 tons is not considered abnormal, especially when the total production of coal is now in the region of 55,000,000 to 58,000,000 tons.

The railways had promised 2,100 wagons a day for coal loading above Moghalsarai by July. The promise was not fulfilled, but it is hoped to reach this figure in the near future, however. The Coal Controller to the Government of India has decided to take certain measures in respect of wagon distribution for block rakes with a view to helping the small collieries. Under this arrangement, from September 1 all wagons for block rakes to States for soft coal and brick burning are being distributed to collieries on the basis of their production of Grades 2 and 3 coals and soft coke.

Coal Shortage in Southern Region

As the acute shortage of coal in the southern region in India is causing grave anxiety, the Madras Government proposes to take up the question of ensuring supply of sufficient quanities of railborne coal at economic prices. The Madras Government will stress that the talk of industrialization of the south will be unreal so long as the region is not ensured of a regular supply of this basic raw material at an economic price. As the coal shortage affects the growth of industries in the southern region as a whole, the Madras Government is of the opinion that all the southern States should take up this question with the Government of India.

The main bottleneck in the supply of coal and coke is the shortage of wagons. Assurances had been given that all assistance would be given to consumers. In spite of all this, the coal supply position still remains extremely difficult and unsatisfactory mainly due to the shortage of wagons. As a result, practically all consumers, including the Mysore Iron and Steel Works, are forced to supplement their supplies with costly consumer fuel.

The Madras Government had suggested in August last year that a pool price should be fixed for coal. As the cost per ton varied from State to State, depending on the proximity of collieries, it proposed that there should be a uniform price fixed for coal throughout India. The matter was taken up by the Madras Government with the Government of India. The Government of India said that the matter had been examined by it and, after considering the views of commercial interests, actual bulk consumers of coal, the various State Governments, and other factors involved, it was decided that it was neither feasible nor desirable to introduce a pool system of freight rate for coal.

However, the Government of India felt that the difficulties of consumers remotely situated from the coal-bearing areas would be reduced in the long run with the progressive development of outlying coalfields, the development of lignite resources in south India, and by the adoption of scientific methods of utilization of coal of comparatively low grade.

Linear Motors for Conveyors

LINEAR induction motors, which have a flat "armature" moving in a straight line instead of the conventional rotating cylindrical armature, have not been extensively developed.

Recent work in the electrical engineering laboratories of Manchester University, sponsored by the National Coal Board, has shown, however, that such

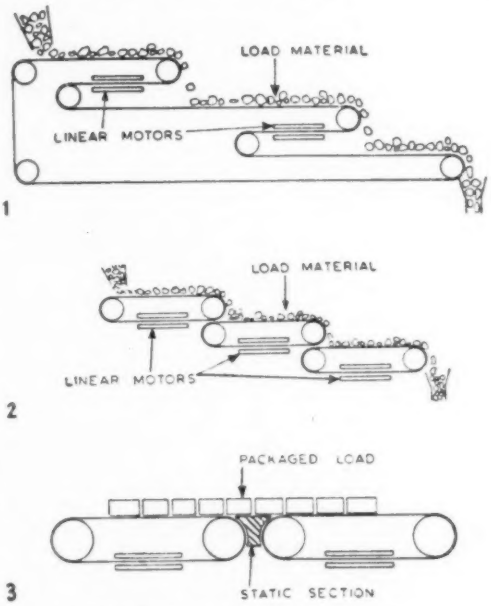


FIG. 1.—THREE METHODS OF APPLYING LINEAR MOTORS TO CONVEYING SYSTEMS.

motors can be applied with advantage to conveyor drives.

The system overcomes many difficulties with conventional drives which results from the application of the drive to the limited area of the belt which contacts the driving pulley. The belt itself is made of conducting material and constitutes the "rotor" of the motor.

STATE OF CARBON IN LIQUID CAST IRON

IN spite of its practical importance, the problem of the structure of liquid iron-carbon alloys has not been widely studied. Available data suggest that carbon in liquid cast iron is present in the form of more or less extensive formations, but there is little direct experimental evidence on the size of these formations and the existence of any boundaries of separation between them. Recent Russian work[1] has been concerned with the structure of liquid cast iron using centrifuge methods, and a brief account of the work is given below.

The centrifuge was built specially for long-term strength testing work; the specimens under test were mounted in corundum crucibles of length 60 mm. and diameter 5 to 7 mm., and these were placed in turn in special holders of heat-resisting steel fixed horizontally at the head of the centrifuge shaft. By this means, one end of the cast-iron specimen was closer to the axis of rotation of the centrifuge than the other, giving a variation in axial force along the length of the specimen.

Heating of Specimens

The specimens were heated in a furnace to a temperature of 30 to 50 deg. C. above the melting point, and a telescopic lifting column allowed the crucibles to be removed rapidly from the furnace. Since the temperature was only slightly above the melting point, crystallization took place almost immediately on removal from the furnace. After centrifuging, the specimens were removed from the crucible, and turnings taken from the upper and lower faces, *i.e.*, the faces closest to and furthest away from the axis of rotation; a chemical analysis of the turnings was then made.

From the data of the tests, representative values of which are shown in Table 1, it is possible to

TABLE 1.—*Representative Data.*

Test.	C content, per cent.		Specimen length, mm.	R.p.m.	Duration of test, min.
	Upper.	Lower.			
A	4.0	2.7	33	1,900	1,275
B	2.7	4.2	32	500	1,250

detect a distinct tendency towards an irregular distribution of carbon under the influence of the centrifugal forces. The upper end, which was closer to the axis of rotation, is enriched in carbon to a greater extent than the lower end. It should be noted that the experiments were carried out in air, so that the open end of the specimen surface was oxidized. In spite of the oxidation, the effect of the centrifuging process predominates over the effect of oxidation when the speed of rotation is 1,700 to 1,900 r.p.m.

Under the experimental conditions, the force acting on the specimens exceeded the force of gravity by a factor of 320 at 1,900 r.p.m. and a factor of 20 at 500 r.p.m. In the latter case it was found that the loss of carbon as a result of oxidation was greater than the effect of centrifuging; it can be stated, therefore, that, in a field 320 times as strong as the gravitational one, separation of the liquid cast iron takes place. In this respect, cast iron as a eutectic alloy does not differ from previously studied fusible eutectics, the only difference being that a much smaller field is necessary for the separation of cast iron. This may be explained by specific features of the graphite-iron system, *i.e.*, the large difference in densities (2.2 and 7.8 gm./cm.^{3}) and the exceptional strength of the planar layers of the graphite lattice.

It is possible from the data obtained to estimate the dimensions of the carbon colonies present in cast iron by considering the forces acting on the particles in a colloid system. It is suggested that the diameter of the carbon particles is of the order of 10^{-6} cm.; this particle size is characteristic of colloidal disperse systems, which have high stability (in particular, their particles do not settle under the influence of gravity).

The above data suggest, therefore, that cast iron is a non-equilibrium micro-heterogeneous system consisting of a dispersion medium, *i.e.*, a saturated solution of carbon in iron, and colonies or micelles enriched in carbon, with particle diameters of the order of 10^{-6}cm. The problem of the structure of the colonies or their binding with the dispersion medium is being studied.

REFERENCE

[1] Vertman, A. A., Samarin, A. M. Doklady Akademii Nauk SSSR 134, 3, p. 629 (1960).

New British Chemical Standards

ISSUE of the following new British chemical and spectrographic standard samples is announced by the Bureau of Analysed Samples, Limited, Newham Hall, Middlesbrough:—

BCS No. 300, 6 per cent. zinc aluminium alloy analysed for Cu, Mn, Si, Mg, Fe, Ti, Cr, and Zn; BCS No. 304, 10 per cent. aluminium bronze analysed for Cu, Zn, Ni, Fe, Mn, Si, and Al; BCS No. 305, 75 per cent. ferro-silicon analysed for P, Al, Ca, and Si; BCS No. 306, 0.4 per cent. carbon free-cutting steel analysed for Si, S, P, Mn, and C. These samples are only available in the finely divided form for chemical analysis.

SS Nos. 21-24 is a series of low-tungsten steels standardized for tungsten only with tungsten contents ranging from 0.7 to 3.4 per cent. This series is supplied in the form of ¾-in. dia. rods each 3 in. long for use as spectrographic standards, but is also available in the form of turnings for chemical analysis bearing the reference numbers BCS 281-284.

Further details of these new samples are given in List No. 400R and the latest supplementary insert sheet, which are obtainable free of charge.

New Patents

PATENTS below are among the complete specifications accepted listed in the Official Journal (Patents). The numbers given are those under which the specifications have been printed and all subsequent proceedings will be taken.

Applications for copies of the full specifications (3s. 6d. each, post free) should be made to the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

Mining and Mining Appliances

872,294 MAVOR & COULSON, LIMITED. Endless belt conveyors.

871,891 MAVOR & COULSON, LIMITED. Machine for mining coal and other minerals.

871,871 MÖNNINGHOFF, S. [trading as MASCHINENFABRIK MÖNNINGHOFF]. Motorized drive for swinging bridges in mine-cage decking plants.

871,971 A. G. WILD & COMPANY, LIMITED. Thrust mechanism for advancing coal-extracting machinery towards a coal face.

872,199 GEWERKSCHAFT EISENHÜTTE WESTFALIA. Apparatus co-operating with a conveyor, for breaking large pieces of coal.

872,266 MINING ENGINEERING COMPANY, LIMITED. Belt conveyors.

872,736 COAL INDUSTRY (PATENTS), LIMITED. Cutter-loader mining machines.

872,871 M. VON LINSINGEN [trading as BOCHUMER EISENHUTTE WEINTZMANN & COMPANY]. Hydraulic pitprop.

872,546 S. MÖNNINGHOFF [trading as MASCHINENFABRIK MÖNNINGHOFF]. Tub decking plant.

873,167 E. BACHEM & K. B. DYCKERHOFF [trading as RUHRTHALER MASCHINENFABRIK 'SCHWARZ & DICKERHOFF KOMM-GES.]. Battery-driven locomotive for use in mining.

873,289 QUALTER, HALL & COMPANY (SALES), LIMITED. Bottom dump skips for guided skip hoists.

873,248 K. LEHMANN. Ring linings for mine galleries.

873,623 COAL INDUSTRY (PATENTS), LIMITED. Skip-loading equipment in mines.

873,489 DOWTY MINING EQUIPMENT, LIMITED. Clamping devices for supporting mine roadway arches and like structures.

Metallurgy and Engineering

872,224 BOT BRASSERT OXYGEN TECHNIK A.G. Methods of refining crude iron.

872,052 UNITED STATES STEEL CORPORATION. Stainless steel resistant to nitric acid corrosion.

871,997 IMPERIAL CHEMICAL INDUSTRIES, LIMITED. Method of and apparatus for reducing the thickness of metals.

872,088 J. DAUBERSY. Steel manufacture.

871,967 INTERNATIONAL METALLURGICAL CORPORATION. Production of alloys of polyvalent metals.

872,062 TEXACO DEVELOPMENT CORPORATION. Ore-reduction process and apparatus.

872,008 IMPERIAL CHEMICAL INDUSTRIES, LIMITED. Heat treatment of ferrous metals.

872,271 MOELLER & NEUMANN G.M.B.H. Locking device for rolls in rolling mills.

872,368 UNITED STEEL COMPANIES, LIMITED. Lances for use in steelmaking.

872,243 FIRTH STERLING, INC. Method of producing superior quality ingot metal.

872,591 BRITISH IRON AND STEEL RESEARCH ASSOCIATION. Casting of metals.

872,944 COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION. Production of rutile from ilmenite and related ores.

872,695 UNITED STATES STEEL CORPORATION. Method and apparatus for vacuum casting.

872,718 DEMAG A.G., and W. SCHMITT. Manufacture of steel.

872,420 VEITSCHER MAGNESITWERKE A.G. Roof arches for metallurgical furnaces.

873,120 LOEWY ENGINEERING COMPANY, LIMITED. Coiler with gripping device for metal strip.

873,149 YAWATA IRON & STEEL COMPANY, LIMITED. Method of producing oriented silicon steel.

872,995 PECHINEY COMPAGNIE DE PRODUITS CHIMIQUES ET ELECTRO-METALLURGIQUES. Process for purifying silicon or a ferro-silicon alloy.

873,306 KEELAVITE COMPANY, LIMITED. Tensioning mechanism for endless conveyor bands.

873,770 OFFICE NATIONAL INDUSTRIEL DE L'AZOTE. Production of iron.

873,570 FOUNDRY SERVICES INTERNATIONAL, LIMITED. Production of steel alloys.

873,733 WESTINGHOUSE ELECTRIC CORPORATION. Magnetic steel.

873,771 OFFICE NATIONAL INDUSTRIEL DE L'AZOTE. Production of iron.

Fuel Treatment and Utilization

873,609 RHEINPREUSSEN AKTIENGESELLSCHAFT FUER BERGBAU UND CHEMIE. Process for the removal of hydrogen cyanide from coke-oven gases.

873,766 FONDERIE DU MOULINET. Stoves for continuous fire, designed particularly for burning dry Fife steam coals.

Continuous Steelmaking

A POSSIBLE practicable method for continuous production of steel is being studied at the central research laboratories of the Broken Hill Proprietary Company, Limited, in Australia. Details of the process, for which patents have been sought, were given by the director of the laboratories (Dr. Howard K. Worner) before the Australian Institute of Metals at Adelaide.

The process, said Dr. Worner, sought to take advantage of the speed of refining molten pig-iron which characterized the LD method, but aimed to achieve greater thermal efficiency and reduction in fume-collection problems. The proposed method also aimed to emulate the open-hearth process in respect of high scrap/ore consumption. In addition, it offered a possibility of a substantially automated operation. In essence, the proposed process combined the strongly exothermic refining operation with a heat-absorbing component. The former was achieved in an enclosed launder-like furnace with an appropriate number of roof lances and slag tap holes. Molten iron flowed in one end and the steel flowed out the other over a simple well system to a holding furnace.

REPORTS FROM BUCHAREST state that work was started on July 17 on the construction of what is to be Rumania's largest integrated iron and steel works, at Galatz. The works is being built with help from the USSR. When completed, in 1970, it will have an annual output of 4,000,000 tons of steel.

Planned Policy for Fuel

Mr. W. PAYNTER'S APPEAL AT TUC CONFERENCE

WARNING that coal consumption was down this year by 1½ per cent., and that 18,000 men had left the industry since January, Mr. Will Paynter, general secretary of the National Union of Mineworkers, urged leaders of the Trades Union Congress to continue their efforts to end the "free-for-all" competition in the fuel industry, particularly the competition of fuel oil, when the TUC annual conference closed at Portsmouth last Friday.

The 1½ per cent. fall in coal consumption, said Mr. Paynter, was equal to 1,750,000 tons. Oil consumption had increased in the same period by 9 per cent., which meant that coal had been displaced in traditional British markets to the extent of 1,250,000 tons.

The industry continued to lose men at the rate of 500 a week. "Until we can compel this Government to operate a national fuel and power policy, a crisis of confidence will continue to affect the industry's manpower," he said.

Attitude to Chancellor

Referring to the Chancellor of the Exchequer's new proposals to set up a joint employer-union economic planning body, Mr. Paynter said that unless his proposals were better than the planning which had been applied so far to the nationalized industries the TUC should not help. He asked the TUC leaders when they met Mr. Lloyd to regard his attitude to the fuel and power industries as an earnest of his intentions concerning the economy as a whole.

The Government had resisted all attempts to produce a planned and co-ordinated programme for the three fuel and power industries, he continued. If the Government could not be persuaded of the need for planning and co-ordination in the publicly-owned industries, there was little prospect of them tackling the problems of privately-owned sectors of industry.

There was a near defeat for the General Council on a motion from Mr. Abe Moffat, former president of the Scottish miners, when he moved the reference back of part of the annual report recording the General Council's decision not to send an eight-man delegation to the British Trade Fair in Moscow earlier this year. This, the report said, was because acceptance of the invitation would be open to "undesirable political interpretations by its sponsors."

Mr. Moffat said the trade fair had been held to popularize British goods made by British workers and technicians, but unfortunately on this occasion the council had not recognized the importance of sending a delegation to support such an effort.

Congress unanimously called on the Government to increase "substantially" the funds allocated for research in nationalized industries. Mr. L. H. Wells, of the Association of Scientific Workers, said that whereas the aircraft industry spent 36 per cent. of its total output on research and development, many other industries spent far less. The National Coal Board, for instance, devoted only 0.74 per cent. of its output to research. It would have to spend an amount comparable to that spent by the oil industry if it was to compete.

Miners' Leader Calls for 40-hour Week

MOTION moved by Mr. S. W. G. Ford, president of the National Union of Mineworkers, calling on the General Council to start a vigorous campaign to convince the Government and industry that a 40-hour week without loss of pay must become operative without delay, was carried at the Trades Union Congress at Portsmouth last week.

MR. S. W. G. FORD

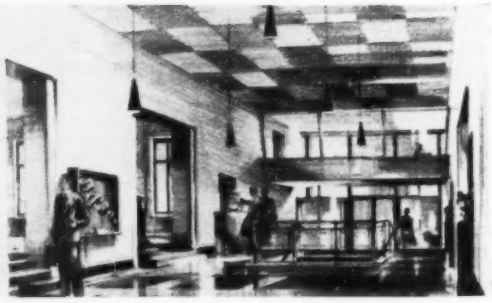
Mr. Ford said that improvements over the past 15 years fell far short of what ought to be conceded by employers in view of technological developments. With modern standards, the production requirements of the British economy could be fulfilled with a shorter working week. A shorter week could well prove essential in maintaining full employment. Technological developments provided enormous scope for higher productivity. The cost of shorter hours should be absorbed, he maintained. Mr. Ford said that ILO statistics showed that the average number of hours worked per week in manufacturing industry in Britain in 1960 were higher than those worked in other west European countries, and considerably higher than those worked in the United States and Canada.

Competition of British Coal in Common Market

BRITISH coal industry would provide severe competition for the privately-owned coal mines in the European Coal and Steel Community, says the annual report of the Ruhr Coalmine Owners' Association.

If Britain joined the Common Market and her coal industry became a member of the Coal and Steel Community, the National Coal Board would become the most important member of the Community, it added.

BIRMINGHAM'S NEW ENGINEERING AND BUILDING CENTRE



NEW "SHOP WINDOW" FOR BRITAIN'S ENGINEERING AND BUILDING TRADES, SEEN ABOVE, IS TO BE OPENED IN BIRMINGHAM NEXT WEEK. THE FORMER MASONIC TEMPLE, IN BROAD STREET, HAS BEEN CONVERTED INTO NEW HEADQUARTERS FOR THE ENGINEERING AND BUILDING CENTRE, BIRMINGHAM. PRODUCTS RANGING FROM TOOL STEELS TO TURBINES WILL BE ON SHOW IN THE 37,000 SQ. FT. BUILDING.

New Works in North-East for Tube Investments

GROUP of new factories is to be built by Tube Investments, Limited, at Washington (Co. Durham), for the long term development of its manufacturing capacity. The company will build on a 280-acre site, and expects to start preliminary work early next year. By 1965 about 750 men and women will be employed in the manufacture of steel tubing. The first factory will house a highly mechanized electric resistance welded tube mill incorporating many advanced engineering features, and subsequent factories will be built in accordance with the development programme for the production of steel tubes and other TI projects. The ultimate labour force is expected to exceed 3,000.

The decision to purchase the site, says Tube Investments, was taken after full consultation with the Board of Trade, local authorities, and district trade union officials. Mr. Ronald Wood, Regional Controller of the Board of Trade, described the project as the biggest single industry to be brought into the North-east since the war. Washington is in the centre of an area with a working population of about 280,000, and at present there are over 7,000 men out of work.

A ONE-DAY CONFERENCE with the object of checking the high rate of accidents in the shipbuilding and repairing industries has been organized by the Minister of Labour, Mr. John Hare. It is to be held at Newcastle-upon-Tyne on October 16 and is the first of its kind. If it is successful a similar procedure may be adopted to deal with other industries where the accident rate is high.

Inter-firm Comparisons Show "Best" Can Improve

SET up two years ago by the British Institute of Management in association with the British Productivity Council, the Centre for Interfirm Comparison has now been active in 20 industries, and has been approached by organizations and firms in many more industries for which comparison projects are currently being prepared. By comparing certain key efficiency figures with those of similar firms in any particular field, the Centre seeks to establish whether any individual firm's performance comes up to the standards achieved by the "best" in that industry.

In its work, the Centre has found some striking points emerging. One is the wide range of results as between one firm and another in the same industry. For example, in one industry the time taken to produce a standard product shows a variation of 2½ to 1; in another industry, the number of days required by firms to collect outstanding debts ranged from 54 to 107. Examples of this kind show what scope there is for most firms in industry to improve their performance.

The Centre find that usually all those taking part in a comparison could improve in some respect, even the "best" firms. It is becoming more clear that the "top test" must be profit on capital employed, and this yardstick must be based on a measurement of real asset values in current monetary terms.

FACTORY COVERING 23,000 sq. ft. at Queenslie Industrial Estate, Glasgow, is being taken over by Revel Engineering (Scotland), Limited, a newly-formed subsidiary of the Revel Engineering Company, Limited, Southall (Middx), for the manufacture of process and cleaning equipment.

Progress with Safety

NORTH STAFFS AMEME PRESIDENT'S THEME

THEME this year of the annual conference of the National Association of Colliery Managers was "Progress with Safety." The same theme was taken by Mr. J. Sutton in his presidential address to the North Staffordshire branch of the Association of Mining Electrical and Mechanical Engineers at Stoke-on-Trent on Monday. Mr. Sutton is assistant to the North Staffordshire Area mechanical engineer of the West Midlands Divisional Coal Board.

Over the years those in the industry, he said, had had to meet the challenge of production drives, large coal drives, sales drives, and the like, the extent of each being mainly dependent upon the state of the market. A drive which could not be allowed to vary with market or policy changes was the continual drive for increased safety.

It must be a matter of some concern that while there was a trend towards lower accident rates, the rate of improvement, compared with 10 years ago, had lessened.

Preventative Maintenance

The president felt that the development of improved mining equipment and techniques would surely lead to safer operating conditions in addition to high productivity, and he thought it significant that the division which had both the highest output per man-shift and the highest proportion of fully mechanized output also had the lowest accident rate.

The introduction at all collieries of a scheme of preventative maintenance was, he thought, "a major step forward in recent years" and added that it should always be borne in mind by engineering staff that the basic object of the scheme, as a whole, was to establish a standard of good practice in inspection and testing and so increase both the safety and efficiency of equipment throughout the collieries. On no account should the scheme be allowed to lag for want of drive and effort from all concerned.

Low standards, if they existed, must not be tolerated and must be raised to an acceptable standard without delay. He believed there was still room for improvement in general design—in the positioning and accessibility of manual controls and standards of operating efficiency, for example—and that manufacturers should be encouraged to improve their designs wherever possible.

Acknowledging that carelessness in installation, operation, or maintenance could convert a safe piece of equipment into a potentially dangerous one, Mr. Sutton emphasized that where specialist items of equipment were involved it was absolutely necessary to understand at least the broad principles of design. The difference between informed and ignorant handling might be the difference between safety and disaster.

He paid tribute to the constant improvement that was being made throughout the industry in the already high standards of apprenticeship training and added that it was not unreasonable to expect an improvement in the accident figures in the next few years.

JOHN FOWLER & COMPANY (LEEDS), LIMITED—Mr. J. R. Pettigrew, works manager, has been appointed a local director.

Coal Exports Improve

COAL consumption for the first 35 weeks of the year at 130,377,000 tons is 2,000,000 tons down on last year. Relatively, however, at 1.5 per cent., the drop is not of serious proportions and the balance could easily be redressed by the end of the year. Exports are over 130,000 tons up on last year. Consumption in the week ended September 2 at 3,252,000 tons was well below the total output (3,566,000 tons).

Consumers' stocks in all sections, except coke ovens, are being built up gradually, the domestic sector being much better placed to meet the heavier demand and possible transport difficulties of the winter than it was a year ago.

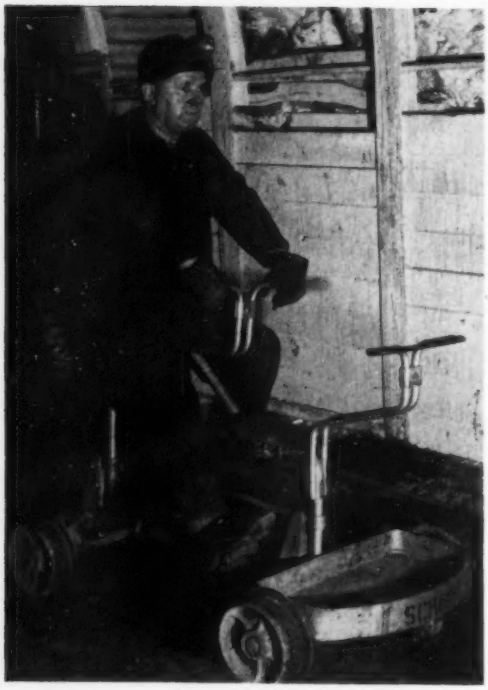
There were 564,430 wage-earners on colliery books on September 2, against 590,880 on September 3, 1960, the numbers engaged at the coal face being 211,670 and 224,810 respectively. Total absenteeism (all workers) in the week ended September 2 was 16.22 per cent., compared with 15.09 per cent. in the week ended September 3, 1960. Output at the face was 4.131 tons and overall 1.424 tons in the week ended September 2, compared with 3.908 and 1.376 tons in the week ended September 3, 1960.

The following table gives (in tons) the provisional figures of output of saleable mined coal by division in the week ended September 9, and the tonnage lost through disputes:—

Division.	Week ended September 9, 1961.		Week ended September 10, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish ..	349,000	7,000	357,000
Northern (NAC) ..	237,000	—	244,000
Durham	439,000	—	468,000
North-Eastern ..	551,000	269,000	566,000
North-Western ..	221,000	12,000	235,000
East Midlands ..	814,000	94,000	777,000
West Midlands ..	278,000	1,000	267,000
South-Western ..	351,000	6,000	369,000
South-Eastern ..	27,000	—	26,000
Great Britain—			
Deep-mined coal ..	3,267,000	389,000	3,309,000
Open-cast coal ..	171,000	—	124,000
Other deep-mined (including licensed mines) ..	43,000	—	42,000
TOTAL	3,481,000	389,000	3,475,000

EXPORTS OF COAL from Sunderland during the first seven months of this year increased by 21,983 tons to 230,263 tons, although overall shipments showed a decrease of 15,744 tons to 1,349,273 tons.

On a Bicycle Made for Two



Mr. Thomas Crellin, manager of West Cannock No. 5 Colliery, in No. 2 Area (Cannock Chase), of the West Midlands Division of the National Coal Board, has invented this four-wheeled cycle for underground tours of inspection. The only colliery manager in the country—and probably in the world—who regularly cycles underground, Mr. Crellin can cover over 3 miles in 20 minutes. "If I can have 100 yds. start, a train with a locomotive can't catch me," he claims.

His mount is based on a child's tricycle and has flanged wheels to fit the underground track. It is propelled like an ordinary cycle and, when not in use, folds neatly away at the side of the track. It can even carry a passenger on the front. "At first everyone thought it was a joke," Mr. Crellin said, "Now they recognize it as a very useful machine."

SILENTBLOC, LIMITED, makers of anti-vibration devices, of Crawley (Sussex)—Group net profits for the year ended May 31, 1961, were £208,673 (£206,804), and the dividend is repeated at 6d. per 2s. ordinary with a final of 3d. per share. The year's dividend is on the capital increased by a two-for-seven rights issue.

Safety in Mines Conference

BRITAIN is to send a delegation of mining safety research experts to the international conference on safety in mines in Poland on October 16. Other countries represented will include Belgium, Czechoslovakia, China, France, East and West Germany, Holland, India, Japan, Hungary, Poland, Rumania, the United States, and Russia. The conference will be centred on Warsaw until October 21 and then, until October 24, at the laboratories and experimental mine at Katowice.

The British delegation will be headed by Mr. H. T. Ramsay, director of the Ministry of Power's Safety in Mines Research Establishment, Sheffield and Buxton, and will include Dr. E. M. Guenault, deputy director, Buxton, Dr. W. L. Murray, Mr. P. L. Bakke, and Mr. J. R. Hodkinson, all of SMRE, and Mr. A. E. Bennett, assistant director of the Mining Research Establishment of the National Coal Board.

The conference will consider 78 papers which are being circulated in advance and which are directed to problems connected with firedamp and coal dust explosions, the development, testing, and use of safe mining explosives, and of safe electrical apparatus, and the prevention of mine fires.

The convenor of the conference is Prof. Cybulski, who is in charge of research at the experimental mine. He has been a leader in research on coal dust explosions and mining explosives for many years.

British Industrialists in Talks with Canadians

A DELEGATION of British businessmen led by Sir Frank Bower, immediate past-president of the Association of British Chambers of Commerce, opened talks in Ottawa today (Friday) with Canadian businessmen. The discussions, which are being held under the auspices of the Federation of Commonwealth and British Chambers of Commerce, will last three days, and arise from the recent formation in Britain of a committee of 21 leading businessmen to expand Commonwealth trade and to meet any situation arising from Britain's entry into the Common Market.

Among members of the delegation are:—Wing-Cmdr. J. M. Aiton, chairman of Aiton & Company, Limited, pipework engineers and ironfounders, of Derby; Mr. Charles D. Gill, chairman and joint managing director of Spencer Wire Company, Limited, Wakefield; Mr. C. H. Marsh, director of Henry Simon (Holdings), Limited; and Mr. C. B. Speller, director of W. & T. Avery, Limited, Birmingham.

Coal from Steelworks Site

BULLDOZERS levelling the site of the £33,000,000 integrated steelworks site at Roundwood and Aldwarke, near Rotherham, for the Park Gate Iron & Steel Company, Limited, have uncovered two coal seams. The first seam has been exploited by the contractors and the coal used to augment stocks taken from open-cast sites in south Yorkshire.

The second seam was not commercially practicable to work and householders in the Parkgate and Dalton districts who have been complaining about the dust coming into their homes from the bulldozers have been allowed to help themselves to a free supply.

IRON AND STEEL TRADE

FURTHER cuts in rolling mill operation have become necessary and in the course of the last two weeks, the number of shifts has been reduced from 17 to 13 per week and there may be a further drop. Generally, the finishing trades are on a four-day week, while the demand for sections, joists, and beams also fluctuates from week to week. Orders are not rising sufficiently to justify bringing the closed steel furnaces back into production and pig-iron outputs are accordingly down. Recently there was a slight rally in sections, but the greatly increased plate capacity is far and away in advance of the demand. The same, however, can be said of almost every type of product.

Pig-iron

All grades of pig-iron are plentiful and much larger quantities than those being demanded could be supplied. From the engineering and speciality foundries fairly substantial demands are being made for the low phosphorus irons. Hematite and refined iron is readily available.

The current call for high phosphorus iron is well below capacity level.

Ferro-alloys

There is little general change, ferro-silicon being active and the demand for ferro-chrome and ferro-manganese at a good level. Calcium silicide is of steady interest and silico-manganese continues to attract support.

The increased attention given to ferro-tungsten is maintained, while ferro-vanadium and ferro-molybdenum are in moderate request. There is a fair demand for ferro-niobium and ferro-titanium.

Semi-finished Steel

Business at the re-rollers is well below normal and the demand for small bars, light sections, and strip is only moderate. Order-books are confined to current business and this is barely sufficient to make up day-to-day rollings.

Forward bookings are scarce apart from reinforcing rods and bars which continue in good demand. Availability of carbon steel billets is much easier than a month or two ago and even makers of alloy steels are open to accept more business, although it is on an extended delivery basis.

Finished Steel

With capacity available for joists, angles, channels, flats, rounds, and all kinds of plate, makers are open to accept further orders for fairly quick delivery. Where the consumer is unable to get a suitable rolling or is unable to supply from his own stock then he usually resorts to the stockholder for the few bars necessary to complete the job.

Sheet makers are finding things pretty grim at present and could easily absorb any new business offering for inclusion in their programmes. The demand for flat and corrugated galvanized sheets is at a reasonable level, but there is still plenty of capacity available.

AT THE trade luncheon of the Gauge & Tool Makers' Association at the Savoy Hotel, London, on October 3, the guest of honour and chief speaker will be Mr. Edward Heath, Lord Privy Seal, who will speak about the Common Market.

Ore Chartering

AFTER a somewhat quiet period markets now show signs of greater activity, all the major North American trades displaying interest in tonnage to load scrap and grain while coal charterers are freely quoting. Sulphur has been fixed from US Gulf to Immingham for about 8,000 tons at 57s. 6d. f.o.b. steamer discharging for October shipment with charterers retaining interest.

In the ore section, Marmagoa/Hirohata Muroran Range took a 9,500-tonner at 49s. 9d. f.i.o. and trimmed for September 20/October 10 and similar size to Yawata Tobata Range at 48s. 6d. with the option of Hirohata at 48s. 9d. for September 22/October 12 with further business quoting for forward positions. Although no fixtures have recently been reported from this loading port to the Continent, business is however available for September/October loadings. From West Africa, Pepel/Amsterdam or Ymuiden reports the fixture of a 10,300-tonner for second half September at the unchanged rate of 28s. and here again it would appear that further business is available for October shipment. Both Rio and Vitoria/Continent are open for tonnage. There is, however, little interest displayed for tonnage to load from the Swedish ore ports to this side or for that matter to the Continent.

The Mediterranean trades continue on the quiet side; tonnage does not offer freely against a fair miscellaneous business, but only a few ore cargoes are noted for Continental destinations.

Casablanca phosphate reports the fixture of a 9,500-tonner to Cochin at 55s. for September 20/October 10; there is some inquiry for UK ports, but business is slow to develop. The Huelva pyrites trade is also a quiet section but charterers display some interest in the handy sizes for UK discharge.

As has been the case for some weeks past, inquiries continue to be put on the market for tonnage to load pig-iron from various loading areas to Japan, and here again tentative contracts are quoting over next year, but owners are cautious and are not prepared to commit their tonnage forward unless at some distinct advantage.

BRITISH PRODUCTS on display at the International Autumn Fair, Zagreb, Yugoslavia, which opened last Saturday, include agricultural machinery, mining equipment, machine tools, diesel-generating equipment and foundry equipment. Nine firms and a trade association are staging individual displays in the official British section, which has been organized by the Board of Trade.

Coalfield News

Welsh Councils Invited to House Miners

CAERPHILLY and Bedwas and Machen district councils have been told by the National Coal Board that it plans to increase the number of men employed at the Bedwas (Mon) Colliery from 1,100 to over 1,700 by 1965, if the councils will provide houses for the miners; if not the project will be dropped. About 600 houses would be required, 400 of them in 1962-63. The board, which already has 3,700 houses in the area, will not consider building any more.

As an incentive to the councils, the board has offered a subsidy of £16 a year per house for 15 years. Caerphilly council has already agreed to build 150 houses for miners at Nantgarw Colliery.

BATHS SUPERINTENDENT at Hatfield Main Colliery, Doncaster (Yorks), since the baths were opened in 1934, Mr. Robert Whitmore retires today (Friday).

THORNHILL COLLIERY BAND had a double success at the annual contest of the Harrogate and District Brass Band Association on Sunday. The band was first in both first and second sections of the contest.

PRODUCTIVITY in the Durham Division of the NCB during the first 35 weeks of the year averaged 23 cwt. per manshift against 21.96 cwt. in the corresponding period of 1960. At the face, productivity reached 65.78 (64.38) cwt. per manshift.

WORKMEN CUTTING FOUNDATIONS for new houses on the Peveril Estate, Chesterfield (Derbyshire) have uncovered two mine shafts more than 100 years old. If the shafts cannot be filled in the location of some of the houses may have to be altered.

COAL AND COKE shipments through the port of Garston in August were: Northern Ireland, coal 45,671 tons, coke 1,001 tons; Eire, coal 7,802 tons; Isle of Man, coal 3,126 tons, coke 152 tons. Foreign coke, 5,141 tons; other coastwise bunkers, coal 220 tons.

DERBYSHIRE MINERS and their families who went on holiday this summer to Riccione, Italy, under a pilot scheme, found that Italian food was not to their liking. Next year it is proposed to take English cooks with the party to provide English meals and drink.

NEW PITHEAD BATHS and locker accommodation are being built at Randolph Colliery, Dysart, Fife. Twice in recent years the 80-year-old colliery has been threatened with closure, but rising productivity, which has now reached more than 70 cwt. per manshift, has earned it a reprieve. About 210 men and boys work at the pit.

ABSENTEEISM WAS HIGH on Monday at the 11 pits in the Doncaster Area of the North-Eastern Divisional Coal Board. Following the week's holiday for the St. Leger, 30 per cent. of the men were absent at the morning shift on Monday. A Coal Board spokesman said the figures were not exceptional for the day after a holiday.

THE MINES RESCUE COMPETITION for the North Staffordshire Area of the West Midlands Division of the NCB will be held at the Central Rescue Station, Berryhill Colliery, Stoke-on-Trent, tomorrow (Saturday). Four teams—Wolstanton, Holditch, Hem Heath, and Parkhall—will compete, the winner to represent the Area in the divisional finals.

ONE OF THE FIRST local authorities to agree in principle to offer land to the NCB for houses so that more miners are attracted to the coalfield, Adwick-le-Street UDC is up against the problem of high rents—£2 13s. 5d., £1 more than miners are paying for comparable houses built 10 years ago. Further discussions on the scheme have been deferred for two months.

EIGHT MINERS at Huncoat and Scaitcliffe collieries, near Accrington, with a combined service of 402 years at the two pits, recently received long-service certificates and watches presented jointly by the North-Western Divisional Coal Board and the Accrington branch of the National Union of Mineworkers. Mr. W. Oldroyd, manager of the two collieries, presented the awards.

NORMAL WORKING was resumed on Monday at the £13,000,000 anthracite pit at Cynheidre, near Llanelly, after a strike by face workers which disrupted production at the end of last week. Nearly 800 men were idle. The dispute concerned certain piece-work rates involving initially only two men. The strikers agreed to return to allow union negotiations to be opened with the colliery management.

AT ITS MEETING in London yesterday (Thursday), the national executive of the NUM decided to submit a claim for a general pay increase for 340,000 day-wage workers. This group includes craftsmen and winding enginemen. The amount of the claim will be decided at next month's executive meeting and will probably be submitted to the NCB before the end of October. The target figure of £1 was mentioned at the NUM annual conference. If this was granted it would cost the industry £15,000,000 a year and, if applied to piece-workers as well, the total could be nearer £30,000,000. The NUM is also seeking talks with the NCB for another cut in hours.

Holidays Effect on Output in West Midlands NCB

ALMOST the whole of the annual holiday in the four Areas of the West Midlands Division of the NCB fell in August, and production was affected accordingly. Saleable output totalled 527,000 tons. Saleable output in the first eight months of this year totalled 9,027,418 tons. This was 3 per cent. less than in the same period last year.

As there was an appreciably smaller labour force during the current year, the gap could have been greater, said a spokesman for the division. The reduction in manpower, however, was offset by higher output per manshift at the coal face and overall, which reflected not only the efforts of the men but the benefits now being derived from extensive modernization of the pits and the development of mechanization.

BICC Cables for Pit Surface Modernization

NEW pithead baths, lamproom, and a canteen have been provided at Gedling Colliery, Gedling, Nottingham, in the No. 6 Area of the East Midlands Division of the NCB. Over 2,000 yds. of mineral insulated cable was supplied by British Insulated Callender's Cables, Limited, for the wiring of the new amenities.

The installation adds another BICC product to other items such as underground cables, couplers and cleats, capacitors, etc., at present in use at the colliery, which has an output of 1,000,000 tons a year.

Mr. EDWIN THOMAS ROBERTS, a director of Bilston Foundries, Limited, with which firm he had been associated for some 30 years, has died at the age of 52.

THE COAL TRADE

RETAIL merchants can be thankful that they are not faced with the situation that confronted them this time last year, when August rumours of the increase in coal prices caused an unprecedented run on supplies, and weeks of delay and frustration for merchants and consumers alike. However, an expanding demand keeps the trade very busy for mid-September, and shortages of popular grades occur in most districts. The dearth of the better anthracites is bringing home to merchants the realization that salesmanship will have to be exercised to push alternative fuels until production from new pits begins to gather momentum. Difficulties in supplying industry are few, and stockbuilding at works is heartening.

DURHAM AND NORTHUMBERLAND

The supply position tends to tighten, more especially in respect of large and superior graded steams. Power-station consumption is higher this year so far by 2,500,000 tons and a useful proportion of this increase has come from colliery stocks in Northumberland and Durham. This business has given an impetus to Northumberland trade, and to shipments from Blyth in particular. Apart from these inferior sorts, Northumberland is well placed in other descriptions and both Durham and Northumberland superior grades are an active trade, with forward supplies of some descriptions tightening.

Durham carbonizing descriptions are a fair trade with Durham gas moving off more readily against seasonal demand, but Durham coking coal and industrial cokes remain average business and not as active as a year ago because of the easier conditions in iron and steel. The export section does not show much activity, but average shipments are maintained.

SCOTLAND

Glasgow—Business in the house coal sector continues to move in line with weather conditions. The comparatively good start to the month was accompanied by a falling off in demand after most merchants had experienced one of the best Augusts for years. But there is confidence that retail sales will gather momentum again, and a good trade is expected during the remaining six weeks of summer prices. Generally speaking merchants are in receipt of programmed tonnages, but there is some difficulty in obtaining the better grades, particularly group 2. Other grades are more comfortable, and supplies are moving with greater freedom.

Consumer demand for anthracite stove nuts is increasing, but supplies are scarce. Sunbrite is not proving an attractive substitute, except as a boiler fuel, the price being against it.

In the industrial market the reduced intake of coking grades by the steel industry is cutting across an otherwise settled trade. Ingot production is running at about four-fifths of what it was a year ago, and the intake of coking coal has been reduced by about one half. The position of carbonizing grades is aggravated by a decline in gasworks' requirements following the starting of the Lurgi plant in Fife. Other sorts are clearing more readily, with consumers beginning to show more interest in improving their stock position. The reduced requirement in metallurgical coke is being met without difficulty.

Fife and Lothians—Trade in both zones shows greater animation, notably in the house coal section. In particular a heavy demand persists for the better class fuels, and in some cases wagons are being despatched much later than merchants had expected. Industrial sorts are also in better request.

Coal Stocks Position

DETAILS of coal stocks as at September 2, 1961, compared with those available at September 3, 1960, are given in the appended table issued by the Ministry of Power.

Figures in parentheses, mainly calculated on the basis of requirements during the winter, indicate the total weeks which the tonnage in stock would last.

	September 2, 1961.	September 3, 1960.
	Thous. tons.	Thous. tons.
Distributed stocks		
Public-utility undertakings—		
Electricity	7,678 (5.8)	5,984 (5.1)
Gas	2,169 (4.2)	1,771 (3.4)
Coke ovens	1,089 (2.2)	1,147 (2.1)
Railways	645 (4.0)	490 (2.7)
Industrial consumers—		
Iron and steel	179 (2.4)	188 (2.4)
Engineering and other metal industries	275 (3.6)	265 (3.4)
Other industries	1,906 (3.6)	1,691 (3.3)
TOTAL INDUSTRIES	2,360	2,144
Merchants' stocks—		
(*a*) House coal	1,517 (2.0)	1,238 (1.7)
(*b*) Anthracite and boiler fuel	230 (3.8)	188 (3.1)
Miscellaneous (estimated)	304	324
TOTAL DISTRIBUTED STOCKS	15,992	13,286
Undistributed stocks—		
At collieries (on ground and in wagons)	18,094	28,186
At open-cast sites	4,283	6,552
TOTAL UNDISTRIBUTED STOCKS	22,377	34,738

A NEW COMPANY, Hardie-Ferodo Pty., Limited, will shortly be formed in Australia with an authorized capital of £A3,000,000 to manufacture and market brake linings, clutch facings, and other friction materials for the automotive and general industrial field. The new company is being created by a merger of the Australia Ferodo interests of Turner & Newall, Limited, and the brake lining division of James Hardie & Company Pty., Limited, Sydney, makers of Hardibestos linings. Turner & Newall will have a substantial minority holding in the new company which will be operated by James Hardie Asbestos, Limited, as a subsidiary.

Board Changes

Leyland Executives for Beans Industries

DEPUTY chairman of Leyland Motors, Limited, chairman of Scammell Lorries, Limited, and managing director of West Yorkshire Foundries, Limited, Mr. Walter West has been appointed executive chairman of BEANS INDUSTRIES, LIMITED, engineers and ironfounders, of Tipton (Staffs).

Mr. Charles Robertson, who is a director and general manager of West Yorkshire Foundries has been appointed managing director of Beans Industries.

Manufacturers of cranes, pulley blocks, etc., S. H. HEYWOOD & COMPANY, LIMITED, Reddish (Ches), has appointed Mr. H. Hole as director and general manager of the Reddish crane branch of the company from early October.

MR. H. HOLE

An expert in overhead crane production and practice, Mr. Hole has for the past 11 years been works director and general manager of the Vaughan Crane Company, Limited, Manchester, and its associated companies. Before this he was departmental works manager at Edgar Allen & Company, Limited, Sheffield. Present general manager of S. H. Heywood, Mr. Hawes, is postponing his retirement indefinitely to continue to share administrative responsibilities.

METAL TRADERS, LIMITED—Mr. R. H. C. Boys has retired from the board.

FFRITH FIRECLAY COMPANY, LIMITED—Mr. D. Gregory has been appointed managing director.

CINCINNATI MILLING MACHINES, LIMITED—Mr. C. R. Meyer has been appointed managing director.

VOSPER, LIMITED—Cmdr. Christopher Dreyer, who joined the company in 1956 as sales manager, has been appointed to the board.

EDWARD WOOD & COMPANY, LIMITED—Mr. J. H. Roberts, managing director, has been appointed chairman in succession to Mr. W. Kirkham, who has retired from the board.

BRAITHWAITE & COMPANY, ENGINEERS, LIMITED—Mr. H. W. T. Hain, a director, has been appointed managing director. Mr. P. Goffey has joined the board and has been appointed deputy managing director.

THOMAS MARSHALL & COMPANY (LOXLEY), LIMITED—Mr. J. R. Gledhill, who joined the Marshall group in 1951 and who is secretary of the company, has joined the board. Mr. A. H. Thompson, works manager, has also joined the board.

B.B. CHEMICAL COMPANY, LIMITED—Dr. T. P. Hughes has been appointed joint assistant managing director. Previously with Tube Investments, Limited, he led that company's research laboratories since the end of 1955, becoming the first director of research.

British Exporters Get Blunt Advice

BRITISH exporters have a "take it or leave it" attitude, said Mr. Arne Lundberg, president of the Swedish Chamber of Commerce, speaking at a Scottish-Swedish trade meeting in Edinburgh on Monday. "If a Swedish customer wishes an amendment made to a machine the Germans will send a man to discuss it on the spot and rush it in the shortest time possible," he said. The same reaction had not been shown by British companies. "It may be that the British believe that their equipment is good enough for the purpose, and that alterations to it are not necessary or possible."

Mr. Lundberg told the meeting, which was organized by the Scottish Council (Development and Industry) in co-operation with the British-Swedish Chamber of Commerce, that it was important that British firms should be prepared to meet any special wishes of customers. Sweden was one of the most difficult and competitive markets in the world, and any Scottish businessman who tried to export to Sweden half-heartedly did more harm than good, not only to his own firm but to the whole of the Scottish export effort. "Stay out if you are not prepared to work the market properly," he urged.

Too many Swedish businessmen had to write to Britain to get price quotations, he said. Few British firms tried to find out if their prices were right, and British salesmanship could be more aggressive. The "take it or leave it" attitude was not an export market attitude. Mr. Lundberg also stressed the importance of delivery dates being adhered to.

In a reference to shipbuilding, he said: "The confidence of the other seafaring nations of Europe in British shipbuilding has been shaken, not because of loss of quality but because of repeated strikes and demarcation disputes. It takes twice the time to build in Britain as it does in Sweden."

At a lunch later, Lord Craigton, Minister of State, Scottish Office, said the result of the first year of closer partnership between the UK and Sweden had been striking. Swedish exports to the UK for the year ended June, 1961, were worth £171,000,000, a 16 per cent. increase over the previous year, and our exports to Sweden were worth £135,000,000, a rise of nearly 9 per cent.

On Tuesday, during a visit to the works of Bruce, Peebles & Company, Limited, the Edinburgh heavy electrical engineering firm, Lord Craigton said that some of Mr. Lundberg's criticisms were justified, others were not. "But in any case," he added, "we should be grateful that our customers bother to come over here to tell us how we are doing."

Sheffield Tool Firm's Plans

A £250,000 development plan for its Sheffield factory was announced by Stanley Works (G.B.), Limited, toolmakers, on Tuesday. The managing director, Mr. Owen Tannett, said that an increase in production of 50 per cent. over the next five years was part of the plan and consideration was being given to entering the power tool market.

Should Britain join the Common Market it was likely that the firm's interests wkould be expanded to factories in Europe and there was also the possibility of a breakthrough into the market behind the Iron Curtain.

Obituary

SIR HERBERT BRITTAIN

From Treasury to ISHRA

FORMERLY Second Secretary in the Treasury and, for the past three years, chairman of the Iron and Steel Holding and Realisation Agency, Sir Herbert Brittain died on Wednesday of last week, aged 67. He succeeded the late Sir John Morison as chairman of ISHRA in June, 1958, and though his tenure had been comparatively short he brought to the important task of the denationalizing of the steel industry and the disposal of the assets of State-owned companies to private investors, exceptional acumen and great administrative and organizing ability.

Educated at Rochdale Secondary School and Manchester University, Sir Herbert entered the Treasury after serving throughout the first world war. He served that department for close on 40 years, being appointed Second Secretary in 1953 and retiring in 1957. He was an acknowledged authority on Supply procedure and wrote the standard Treasury manual on the subject.

Sir Herbert was principally responsible for framing the War Damage legislation and had a great deal to do with the construction and presentation of all the War Budgets and the Bill to nationalize the Bank of England. He was made CB in 1941, created KBE in 1944, and KCB in 1955.

The death took place at Glasgow on Tuesday of Mr. JAMES MCKENZIE MCGEE, formerly commercial manager for John Brown & Company (Clydebank), Limited.

The death took place on Saturday of Mr. GUY FALLA, chairman of Fergusson, Wild & Company, Limited, shipbrokers and ore merchants, of London, E.C.3. He was 50.

Labour relations officer at Rubery Owen & Company, Limited, Darlaston, since 1946, Mr. JAMES BURRELL died recently at the age of 58. He began work with the company in 1924 as an electrician.

Deputy chairman and formerly chairman of Cammell Laird & Company, Limited, Mr. JOHN CHADWICK MATHER has died at the age of 57. He became a director of the company in February, 1951, and was appointed chairman nine months later in succession to the late Sir Robert S. Johnson. He relinquished the chairmanship in 1959 for health reasons. Since 1959, Mr. Mather has been High Sheriff of Flintshire.

Uranium as Alloy to Improve Steel

POTENTIAL new application of uranium as an alloying material in steel production has been developed to the pre-commercial stage by Canada's Department of Mines. The Department claims that even very small amounts of uranium added to low-carbon steels greatly improve corrosion and creep resistance.

Canadian metallurgists believe the improvement is attractive enough eventually to create an annual demand for some 1,000 tons of uranium.

Tinsley Rolling Mills Annual Report

IN spite of a less optimistic forecast last year for the results for the year to June 30, 1961, of the Tinsley Rolling Mills Company, Limited, the chairman, Lord Riverdale, is able to report another increase in profits. There was a slightly lower volume of working, but it is felt the company is reaping the benefit of the re-equipment during recent years. Gross profit was £77,043 (£69,115), and, after tax, £39,513 (£33,547).

Lord Riverdale says that possibilities of improving the plant are continually being explored with a view to reducing costs and increasing output. This is increasingly necessary as external costs continue to rise. The 1960 increase in coal prices finally decided the board to abandon its previous policy of using coal wherever possible. The increase in the price of fuel oil in the recent Budget was disappointing, but it was felt that the right decision had been made.

Most departments were working fully and in the absence of unforeseen and adverse developments it was likely that the present level of earnings would be continued.

£1,800,000 Russian Order for Simon Handling Engineers

CONTRACT worth £1,800,000 for Simon Handling Engineers, Limited, Cheadle Heath, Stockport, has been signed with Techmashimport, the Russian trading organization. The order is for the supply of complete machinery and equipment for handling, storing and the automatic weighing of the basic raw material for tyre-making in a new tyre factory to be built at Voljsk, near Stalingrad.

The contract, which took nine months of negotiation, was signed in Moscow by Mr. J. V. Goddard, assistant managing director of Simon Handling Engineers. With contracts already received from Techmashimport for existing tyre factories, this puts the Stockport firm's total orders received during 1961 for this type of work for the Soviet Union beyond £2,000,000.

MEMBERS OF the Russian trade delegation at present in Britain visited the works of Cravens, Limited, engineers and rolling stock manufacturers, of Darnall, Sheffield, on Tuesday.

Company News

GEC Chairman on Group Profit and Finance

UNSATISFACTORY level of profit, and finance, were two serious problems facing the board of the General Electric Company, Limited, at the present time, said Mr. A. L. G. Lindley, chairman, at the annual meeting. Addressing shareholders for the first time as chairman, he said the net overdraft, which at the end of March was £11,250,000, was now £13,000,000. Acceptance credits were up from £2,000,000 to £3,500,000. Largely responsible for the size of the overdraft was the Hunterston nuclear power station where work had absorbed £8,500,000 more than payment received on account—and this did not include any financing by GEC's associates.

Despite the high level of bank indebtedness, the company was not proposing to make a rights issue. The overdraft would remain at the present level for a short period, after which it would be reduced as a result of realizations, seasonal factors and a more satisfactory cash flow.

On current prospects, Mr. Lindley said there were good grounds for expecting a profit recovery from last year's exceptionally low level, but added: "I would not like to predict too firmly the results in profits for the year in the present unsettled state of the economy."

SANGAMO WESTON, LIMITED, manufacturers of electric meters and apparatus, of Enfield (Middx)—Trading profit for the six months ended June 30 increased to £325,652 from £268,200 in the corresponding period of the previous year.

ARMSTRONG SHOCK ABSORBERS, LIMITED—Group profits for the year to June 30, 1961, fell from £698,651 to £354,087, and, after tax of £185,772 (£333,887), the net balance is £168,315 compared with £364,764. The dividend is maintained at 25 per cent.

JAMES HOWDEN & COMPANY, LIMITED, marine and general engineers, of Glasgow—Group profits for the year ended April 30, 1961, fell from £929,514 to £802,524, and, after tax of £380,819 (£407,761), there was a net profit of £421,705 (£521,753). Final dividend of 20 per cent. is being paid, making a total of 25 per cent. (same).

WILLIAM JACKS & COMPANY, LIMITED, metal merchants, importers and exporters, of London, E.C.2—Estimated profits for the first half of the current year are within a few pounds of those for the same period of the previous year, said Mr. W. Gray Buchanan, chairman, at the annual meeting. Orders on hand at June 30 showed an increase compared with last year.

A. REYROLLE & COMPANY, LIMITED—Payment of an unchanged interim dividend of 3 per cent. in respect of the current calendar year is announced. For 1960, this was followed by a final payment of 9¼ per cent. Reporting in April, Mr. H. H. Mullens, chairman, said that the inflow of orders had reached a high level and the works would be fully employed for at least the next 12 months.

COGHLANS, LIMITED, holding company for iron and steel concerns, of Hunslet, Leeds—Group trading profit for the year ended March 31, 1961, is £100,880 (£103,715) and the net profit is £31,859 (£41,682), after tax of £32,512 (£26,457). The dividend is 7½ per cent. (5 per cent. equivalent), plus 8d. net per £1 ordinary (same) from capital accretions. The directors state that the decline in demand for the company's products experienced in the latter half of last year has continued and coupled with increased fuel and working costs, is producing less favourable conditions.

HEENAN, BEDDOW & STURMEY, LIMITED, structural engineers and lock manufacturers, of Manchester—In his annual statement, the chairman, Mr. Harry Lane, reports a loss of £1,089 (£15,923). Turnover did not show any immediate prospect of substantial improvement and the one thing he was not prepared to do was to take on work at uneconomic prices. No dividend is recommended.

ALEXANDER STEPHEN & SONS, LIMITED, marine engineers and shipbuilders, of Glasgow—There was a net profit for the year to March 31, 1961, of £356,663 against £329,639, after tax of £211,922 (£152,537 plus £10,340 licence costs). A final dividend of 10 per cent is announced making a total of 12½ per cent. Holders received a dividend of 10 per cent. for 1959-60, plus distributions of 5 per cent., not subject to tax, from capital reserves.

JOHN OAKEY & SONS, LIMITED, emery cloth and polish manufacturers, of London, S.E.1—The directors propose a one-for-one scrip issue and announce that a conditional agreement has been made for the purchase of the whole of the issued share capital of Flexible Abrasives, Limited, a private company, for a cash sum of £35,000 and the allotment and issue of 92,000 ordinary £1 shares (ex capitalization). It is proposed to convert the employees' shares into ordinary shares.

BROMILOW & EDWARDS, LIMITED, manufacturers of hydraulic tipping gear, etc., of Bolton—The company is raising its interim from the equivalent of 5¼ per cent. to 6 per cent. for the year to November 30, 1961, on capital increased by a 33⅓ per cent. scrip issue. Last year's total was equivalent to 13½ per cent. Trading results so far this year would justify a higher rate of interim, state the directors, but it has been decided to restrict the payment to 6 per cent. in view of the Chancellor's appeal for restraint.

JOHN THOMPSON, LIMITED, combustion and general engineers, of Wolverhampton—Interim dividend of 5 per cent. is being paid in respect of 1961. A similar payment was made for the previous year, but no final was declared. The 1959 total was 20 per cent. Last month Sir Edward Thomas, chairman, reported that output for the first six months of the current year was 14 per cent. higher than the corresponding half year of 1960, while orders received for the past six months were up by a similar rate.

A.P.V. COMPANY, LIMITED, makers of specialized process plant and equipment in stainless steel and aluminium, of Crawley (Sussex)—Group turnover and profit for the first half of 1961 exceed those of the corresponding period last year. Interim dividends are resumed with a 3½ per cent. declaration. The last interim was on account of 1955. Reminding shareholders of the Chancellor's request for dividend restriction, the directors state that the interim should not be regarded as denoting an increase in the year's total.

BRITISH ALUMINIUM COMPANY, LIMITED, London, S.W.1—The company has purchased the 40 per cent. shareholding of Distillers Company, Limited, in Magnesium Elektron, Limited, with effect from July 7, 1961, which, with the 60 per cent. already owned, makes that company a fully-owned subsidiary of British Aluminium. Magnesium Elektron is the sole producer of magnesium metal and the established leader in the magnesium field in the UK. Major C. J. P. Ball, who was responsible for the formation of Magnesium Elektron in 1936, will continue as chairman of the company.

NEWS IN BRIEF

EMPLOYEE of Steel, Peech & Tozer, branch of the United Steel Companies, Limited, Mr. J. Pickles has been appointed full-time divisional organizer for the Sheffield district office staff of the Iron and Steel Trades Confederation.

NOMINAL CAPITAL of the Westinghouse Electric International Company in Geneva, a subsidiary of Westinghouse Electric Corporation, has been increased from Sw. Fcs. 500,000 to Sw. Fcs. 5,000,000 to make possible a new expansion of its activities.

TOTAL of £52 a year is to be given by Sheffield and District Engineering Trades Employers' Association to technical colleges in the area as prizes for part-time engineering students. This is part of the association's plan to stimulate interest in industrial education.

BECAUSE OF a falling off in demand from the motor industry, some founders at the works of Ley's Malleable Castings Company, Limited, Derby, are to be put on an immediate four-day week. The mechanized foundry is to continue to work to capacity.

INFLATABLE nylon rubber bags are being used by the Northern Gas Board, Newcastle-on-Tyne, as small gasholders during repairs to holders at small gas plants. The bags, made by Dunlop, Limited, at Manchester, are 35 ft. long, 15 ft. wide and 15 ft. high, and will store 7,500 cu. ft. of gas.

ANOTHER TWO apprentices of Leyland Motors, Limited, have been awarded technical State scholarships by the Minister of Education. This brings the number awarded this year to part-time students at the company's day continuation school to 11—nearly 5 per cent. of the total awarded throughout the country.

CHEQUE FOR £100 was presented by the management of Consett Iron Company, Limited, to Mr. Richard Prince, 61-year-old motorman employed at the company's Jarrow plant, whose prompt action in switching off a faulty electric generator prevented damage which might have put the works out of action for some time.

WEST HARTLEPOOL shipbuilding and repairing firm, William Gray & Company, Limited, which is now without new orders, hopes to maintain its labour force of 1,400 men by concentrating more on repair and general engineering work. The firm will build new ships if orders are received, but no new contracts will be accepted at uneconomic prices.

PRODUCTION and development departments of Optoshield, Limited, makers of eye protection and other safety devices, have been moved to new accommodation at Watford (Herts) as part of a new development programme. The sales department and head office remain at 146, Clerkenwell Road, London, E.C.1, where orders should continue to be sent.

CASE FOR a wage increase for all adult manual workers is to be put by the engineering unions at a meeting with the Engineering Employers Federation on September 27. The Federation, which will then submit the claim to its members, has agreed to give its reply at this meeting on two other matters, a pay claim for day shift workers, and a demand for Bank Holiday payments.

DAY-RELEASE from employment for part-time education in Scotland is, in many cases, disappointing, states the second report of the Scottish Education Consultative Council expressing concern at the failure of the system to develop. At the invitation of the Secretary of State for Scotland the council has set up a committee to consider and promote possible "legislative and other measures."

CHAIRMAN OF THE SEMINAR session at the forthcoming coke production seminar and plant tour to be held at Michel, British Columbia, on October 5-7, 1961, will be Mr. David E. Wolfson, a leading US authority on coal carbonization. Subject of the seminar will be "Trends in Coke Production Technology and Economics, By-product Costs and Revenues, and Coal Chemical Markets."

THE Kawasaki Steel Corporation is negotiating with the Rhodesian Iron & Steel Corporation, Limited (RISCO), for the construction of two blast furnaces in Rhodesia, a spokesman for the Japanese company said recently. The two companies plan to co-operate in the building of a new blast furnace at RISCO's Redliff mill, and another at Bukwe, where RISCO plans to develop iron-ore mines.

WORLD RECORD was claimed by John Readhead & Sons, Limited, South Shields, when it launched the 13,000 tons deadweight cargo motor ship Trefusis on Monday for the Hain Steamship Company, Limited, London. It was the 86th ship to be built by Readheads for these owners in the past 83 years. No other shipbuilding company, it is claimed, has turned out so many merchant ships for the same owners.

FROM OCTOBER 1, Grades Metals, Limited, Chertsey (Surrey) will be the Midland, Southern England and Wales stockholders for Steel, Peech & Tozer, branch of the United Steel Companies, Limited. The appointment follows the introduction of Steel Peech & Tozer's new strip mill at Rotherham. Grades Metals will continue to act as stockholders for the products of John Summers & Sons, Limited.

PROFESSOR OF MANAGEMENT at Massachusetts Institute of Technology, Prof. D. McGregor is visiting London in the autumn to lead the British Institute of Management's conference on "Management Succession and Development" which will be held at the Connaught Rooms, London, W.C.2, on October 12. Mr. Norman Fisher, former principal of the National Coal Board staff college, will take the chair at the conference.

SINGLEHURST ENGINEERING, LIMITED, specialists in industrial hose and high pressure flexible pipes and fittings, has moved to larger premises with greater facilities at 72-76, Clun Street (off Carlisle Street), Sheffield 4. The telephone number remains at Sheffield 29919. Singlehurst Engineering was established just under a year ago by Mr. E. C. Brookes, of Sheffield, in conjunction with Singlehurst Equipment, Limited, Northampton.

STEEL-ROLLING section of Cordes Steel Mills, Limited, Newport (Mon) will be closed down in about two weeks' time. Nearly 50 men employed in the rolling plant were given notice when they reported for work on Monday. Local steel plants, including the Spencer steelworks of Richard Thomas & Baldwins, are to absorb the redundant men. The galvanizing section of the works is not affected, and the company will continue to manufacture wall ties.

MEMBER OF the executive of the Electrical Trades Union, Mr. Sam Goldberg has been told by his employers, Imperial Chemical Industries, Limited, that it cannot continue to grant him leave of absence for union purposes. Mr. Goldberg, who is seeking re-election to the union executive in the current elections, is employed in the metals division of ICI as an elec-

tronics expert concerned with instrument development. The company said that in recent months the amount of time he has been taking off has risen considerably.

IT IS REPORTED that a £7,000,000 development programme is planned in Sierra Leone which will improve the port facilities at Pepel and allow major increases in the iron-ore milling capacity at Marampa. Barclays Bank D.C.O states that this new project will increase the output of Marampa by about 50 per cent. A new ship-loading berth at Pepel is to be built so that large ore carriers will be able to berth there, and the stocking capacity for oil is also to be increased.

TWO-DAY SEMINARS on "sales forecasting" have been arranged by Materials Management International Limited, in co-operation with Industrial Education International, Limited, to take place in Birmingham on October 23-24, in London on October 26-27, and in Manchester on October 30-31. They will be conducted by Dr. A. E. Schaefer. Details may be obtained from Materials Management International, Limited, 66, Chandos Place, London, W.C.2 (telephone: TEMple Bar 9021).

TIME TAKEN to build the average ship has, over the past three years, been cut by one-third by the Wallsend-on-Tyne shipbuilders, Swan, Hunter & Wigham Richardson, Limited. At the same time the labour force has been held at about 4,000 men. Commenting on this in a survey of the company's methods and reorganization, the British Productivity Council's bulletin states that the achievement has kept prices competitive and the company's Wallsend and Neptune yards fully employed at a time when the shipbuilding industry generally found building capacity in excess of demand.

Integration of Clyde Marine Engine Firms

INTEGRATION of David Rowan & Company, Limited, and the Fairfield Shipbuilding & Engineering Company, Limited, both of Glasgow, which was foreshadowed by the report in June that the two firms were to co-operate more closely, is now in progress, and from October the technical and commercial staffs of both companies are to be combined in Fairfield's offices.

The firms concerned are two of the major marine engine builders on the Clyde and are both members of the Lithgows, Limited, group of companies. It was stated in June that they had decided to rationalize a number of activities in order to improve their competitive position, especially in the marine engineering field.

RISE OF £18,000,000 IN ANGLO-SOVIET TRADE

IN the first seven months of this year Anglo-Soviet trade increased in value by £18,709,866 compared with the corresponding period of 1960, according to figures published by the British Council for the Promotion of International Trade. Imports from Russia totalled £37,442,214 compared with £30,640,661 up to the end of July last year. The value of exports from Britain to the Soviet Union was £26,215,380 (£24,335,306), and of re-exports £16,594,381 (£6,566,142).

Among UK exports, machinery for textiles, sugar making and refining, gas and chemical production, and plastics and rubber working, made the main contribution.

Manpower Inquiry Urged in British Shipyards

AN employer-union inquiry into the use of manpower in British shipyards is recommended in a report issued by a joint management and trade union productivity team which visited shipbuilding yards in Sweden in October, 1959. It also suggests that consideration might be given to the arrangements in Sweden affecting welfare, apprenticeships, works councils, production planning and redundancy, to ascertain whether any could be introduced with advantage in this country.

The report, "Shipbuilding in Sweden," published by the British Productivity Council, states that while the Swedish shipyards' decision to concentrate on bulk carrier and cargo vessels undoubtedly contributes to cost reduction, as does the tax relief on capital investment, they contribute only a minor proportion of the reduced cost and high rate of output. The major proportion arises from the relatively high output rate, or productivity, of individual labour.

"This productivity," says the report, "arises from the allowable flexibility of labour and the discipline of labour and employers—flexibility in that any man within the industry is free to do any work within his physical and technical ability, and discipline, in that labour and management respect and honour the decisions and agreements of their elected representatives." The trade union members of the team add that this flexibility of labour is "mainly to avoid redundancies, or to relieve bottlenecks, and is not practised promiscuously, as contended by the employers' delegation."

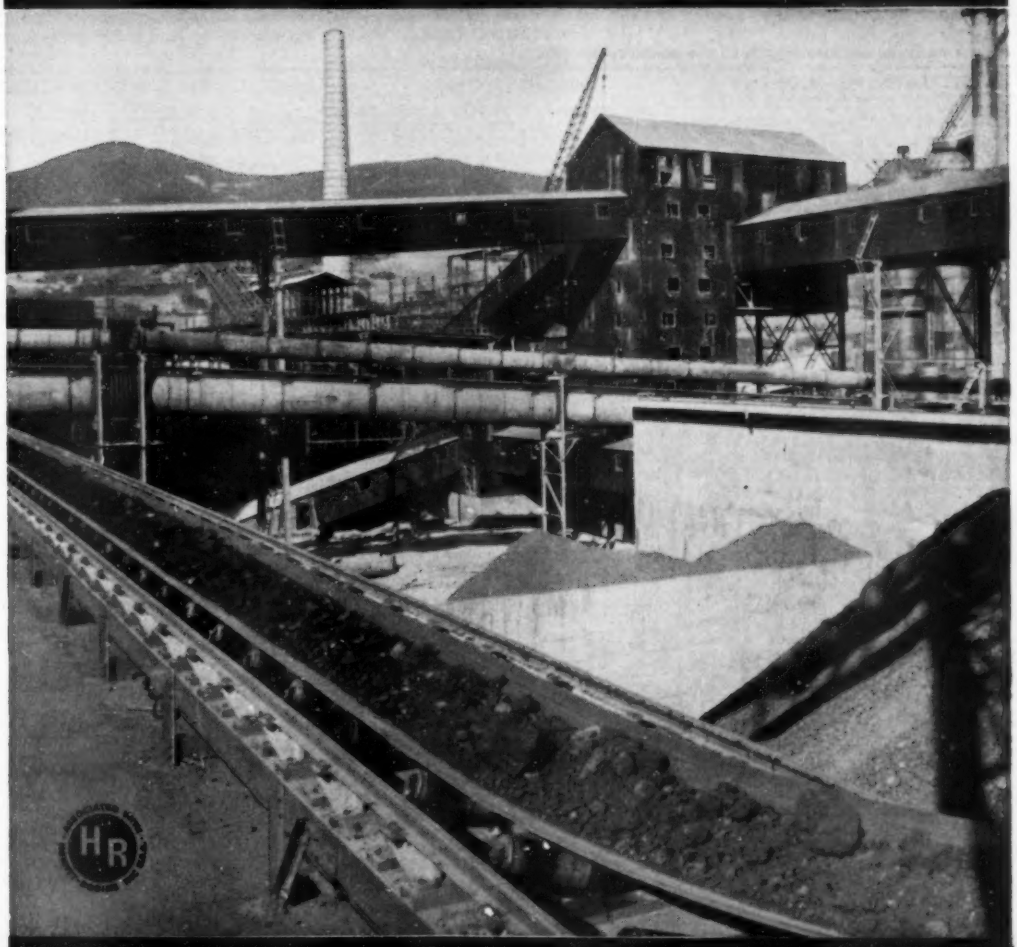
Freer Movement of Labour in the Common Market

FIRST measures to liberalize the migration of workers within the Common Market countries came into effect at the beginning of this month. During the first stage, the national labour markets will still enjoy a certain degree of priority, and in most cases nationals from other EEC countries only become eligible to fill a vacancy when it has been registered in the labour exchanges of the employer's country for three weeks.

Employers are required to treat their foreign workers on exactly the same basis as their own nationals as regards wages, fringe benefits, and trade union membership. To improve co-operation between national labour offices, the EEC Commission in Brussels is setting up a European Co-ordination Bureau, aided by an advisory committee and a technical committee of officials. Labour importing countries tend in practice to give priority to foreign workers from other EEC countries over other foreigners. Germany is planning to attract an additional 100,000 Italian workers, and Holland has recruited in Italy before attracting Spaniards.

INTERNATIONAL NICKEL COMPANY (MOND), LIMITED—Mr. D. Parry Davies has been appointed a director of Mond Nickel (Retirement System) Trustees, Limited, and is succeeded as comptroller of International Nickel Company (Mond), and Henry Wiggin & Company, Limited, by Mr. L. C. H. Voss. Mr. C. W. R. Edwards has been appointed secretary of International Nickel Company (Mond), and Henry Wiggin & Company, in succession to Mr. E. Vaughan, who remains a director of both companies.

Mine to mill, ship to shore, start to finish



. . . G.E.C. designs, builds and installs comprehensive bulk handling plant in many parts of the world

RELY ON THE EXPERIENCE OF G.E.C.

THE GENERAL ELECTRIC CO. LTD. OF ENGLAND, FRASER & CHALMERS ENGINEERING WORKS, ERITH, KENT

367

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: **Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Number 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATIONS VACANT

REPRESENTATIVE

required by a leading Company of Mining Machinery Manufacturers for the North Eastern Division of the National Coal Board. Applicants should give full details of education, experience and some indication of salary required. 1st Class Certificate of Competency would be an advantage.

Box RR 422 Iron & Coal.

INLAND REVENUE VALUATION OFFICE

PENSIONABLE posts for qualified men as 3rd Class Valuers in the Mineral Section, which has offices in London, Birmingham, Leeds, Newcastle upon Tyne, and Cardiff. Age: at least 24 and under 34 on 1.10.61; extension for candidates with regular Forces service or Overseas Civil Service. Qualifications: Final examination of R.I.S.C., C.A. and E.A.I., or C.L.A.S., or B.A. (Cantab.) or B.Sc. (Lond.) in Estate Management (preferably Final examination of R.I.C.S. in Mining sub-division) or 1st Class Certificate of Competency (Mine Managers); knowledge of mining subsidence and the principles of valuation of minerals; at least 4 years' experience of mining. Starting salary from £858 (24) to £1,258 (34 or over); scale maximum £1,430. Promotion prospects. Write CIVIL SERVICE COMMISSION, Burlington Gardens, London, W.1, for application form, quoting 149/61/43. Closing date 17th October, 1961.

MINISTRY OF POWER: MINES INSPECTORATE. Permanent posts for men at least 27 on 1.4.61 with First Class Certificate of Competency under Mines and Quarries Act, 1954, and at least two years, normally within the previous five years, as manager or under-manager of a mine (preferably coal mine) under that Act. Practical knowledge of metalliferous mining and quarrying an advantage. National salary scale £2,371—£2,650. Starting pay may be above minimum. Write CIVIL SERVICE COMMISSION, 17 North Audley Street, London, W.1, for application form quoting S/4975.

REPRESENTATIVE REQUIRED

FIRST-CLASS man required, well educated and of smart appearance. The applicant must possess a wide knowledge of coal-face equipment and methods.

A salary within the scale of £1,000—£1,400 per annum is offered, and this is dependent on age, qualifications and experience.

A company vehicle will be provided.

Please write in the first instance, giving details of education, experience, etc., to MINING SUPPLIES LIMITED, High Street, Arksey, Near Doncaster.

EDUCATIONAL

WEST RIDING COUNTY COUNCIL. ROTHER VALLEY INSTITUTE OF FURTHER EDUCATION. DINNINGTON CENTRE.

APPLICATIONS are invited for an ASSISTANT Grade "B" for mining and ancillary subjects in General Certificate Mining and Boy Entrants' courses. The person appointed may also be expected to take part in Deputies and Shotfirers' course. Salary £700 × £27 10s. to £1,150 with allowances for approved qualifications, war service, training and industrial experience.

Application forms and further particulars obtainable from A. E. HALL, Thornbank, 38 Moorgate Street, Rotherham, to whom completed forms should be returned within fourteen days from the appearance of this advertisement.

UNION OF EDUCATIONAL INSTITUTIONS

APPLICATIONS are invited from suitably qualified applicants for the undermentioned vacant examinerships:—

MINING

INTRODUCTORY MINING. Mathematics B, Drawing B.

SENIOR MINING: FIRST YEAR. Mining Mathematics S.1, Mining Engineering Drawing S.1.

SENIOR MINING: THIRD YEAR. ORDINARY NATIONAL CERTIFICATE. Mining Technology S.3, Mechanical Engineering Science S.3, Electrical Engineering Science S.3.

COAL MINING CERTIFICATE CMC3. Mining Technology, Mechanical Technology, Mechanical Practice and Regulations.

Application forms, which should be completed and returned by midday on 30th September, together with further details of these appointments, can be obtained from the offices of the Union. Please enclose a stamped and addressed foolscap envelope and mention the subjects for which forms are required.

J. ASPINWALL,
Secretary.

Norfolk House,
Smallbrook Ringway,
Birmingham 5.

AUCTIONEERS AND VALUERS

FULLER HORSEY
SONS & CASSELL

Specialists in the

SALE & VALUATION

of INDUSTRIAL PLANT & PROPERTIES of ALL TYPES

SINCE 1807

10 LLOYD'S AVENUE
LONDON E·C·3
TELEPHONE: ROYAL 4861

AUCTIONEERS AND VALUERS —*contd.*

MICHAEL FARADAY & PARTNERS

Established 1896

CHARTERED SURVEYORS

Valuations of Factories, Works & Plant for all purposes.

Specialists in Rating & Derating of Industrial Premises, Machinery & Plant

40, BROOK STREET, LONDON, W.1

Telephone: GROsvenor 8446 (5 lines)

HENRY BUTCHER & CO.

Specialists Auctioneers and Valuers of Plant and Machinery Factory Agents and Surveyors

Fire Loss Assessors

73 CHANCERY LANE
LONDON, W.C.2
Telephone: HOL. 8411 (8 lines)

MACHINERY FOR SALE

85 H.P. Standard gauge Diesel Locomotive, weight 16 tons, by MOTOR RAIL. Sale or Hire.

JOSEPH PUGSLEY & SONS, LTD.,
Bristol, 5.
Tel.: Bristol 54037.
Grams.: "Piston," Bristol.

TWW

MASSEY 3 cwt. Clear Space Pneumatic Hammer, B.11544, motorised 400/3/50.
MASSEY 7 cwt. Guided Type Pneumatic Hammer, B.11541, motorised 400/3/50.
BRETT 5 cwt. Friction Lift Drop Stamp.
MASSEY 1 cwt. Spring Power Hammer, overhang type.
HERCULES 160 lb. Belt Driven Forging Hammer, New.
GOLIATH 60 lb. Belt Driven Forging Hammer, New.
AVERY 1412 Direct Reading Hardness Tester.

THOS W. WARD LTD.
ALBION WORKS · SHEFFIELD 4

Phone: 26311 Ext. 307.
Grams: Forward, Sheffield.

Remember - Wards might have it!

MACHINERY FOR SALE—*contd.*

600

TWO 2½ ton capacity CAPSTANS by Stothert & Pitt, each driven by 28 h.p. 400/3/50 slipring motor, with control gear.

GEORGE COHEN
SONS & CO., LTD.
WOOD LANE, LONDON, W.12.
Tel.: Shepherds Bush 2070.
and STANNINGLEY, nr. LEEDS.
Tel.: Pudsey 2241.

FOR SALE.

SECONDHAND Steel Sections, Channels, Angles and Joints. Secondhand Railway Material.

THE MOTHERWELL MACHINERY & SCRAP CO., LTD.
P.O. Box No. 15,
INSHAW WORKS,
MOTHERWELL.
Telephone: Motherwell 4536/7/8.
Telegrams: "Scrap" Motherwell.

WANTED URGENTLY

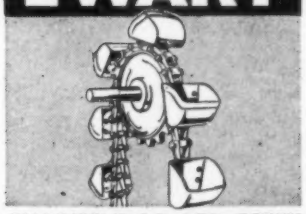
Discarded Sacks, Slag Bags, Old Sacking.

For good prices and prompt settlement sell to actual users.

JOHN COTTON
(JUTE LTD.)
NUNBROOK MILLS
MIRFIELD · YORKSHIRE
Tel: Mirfield 3306-7

For **TURBINE PUMPS**
WRITE TO
PULSOMETER ENG. CO., LTD.
READING
LONDON OFFICE:—
PULSOMETER HOUSE,
20/26 LAMB'S CONDUIT STREET, W.C.1.

EWART



CHAINBELT CO. LTD. DERBY
ELEVATORS, CONVEYORS AND ACCESSORIES
MALLEABLE IRON AND STEEL CHAINS FOR ALL DUTIES

Metal treatment
and Drop Forging

A monthly journal devoted to the properties, uses, testing and treatment of special steels and light alloys, and to forging technique in all its branches.
2/6d. per copy, 30/- yearly.

Write for a specimen copy to:
Metal Treatment & Drop Forging
John Adam House,
17/19 John Adam Street, London, W.C.2.

THE HIGHEST STANDARD OF EFFICIENCY AND RELIABILITY
"WHITTAKER"
BRICKMAKING MACHINERY
Sole Makers and Patentees—
C. WHITTAKER & CO. LTD.
ACCRINGTON.

SUBSCRIPTION ORDER FORM.

To the PUBLISHER

IRON & COAL

TELEPHONE: TRAFALGAR 6171
JOHN ADAM HOUSE · 17/19 JOHN ADAM STREET
ADELPHI · LONDON · W.C.2
TELEGRAMS: "ZACATECAS, RAND, LONDON"

Please send the IRON AND COAL to the address given below until countermanded, for which **£2. 12s. 0d.** (Home) **£3. 0s. 0d.** (Abroad) is enclosed in payment of One Year's Subscription.

Name.....

Address.....

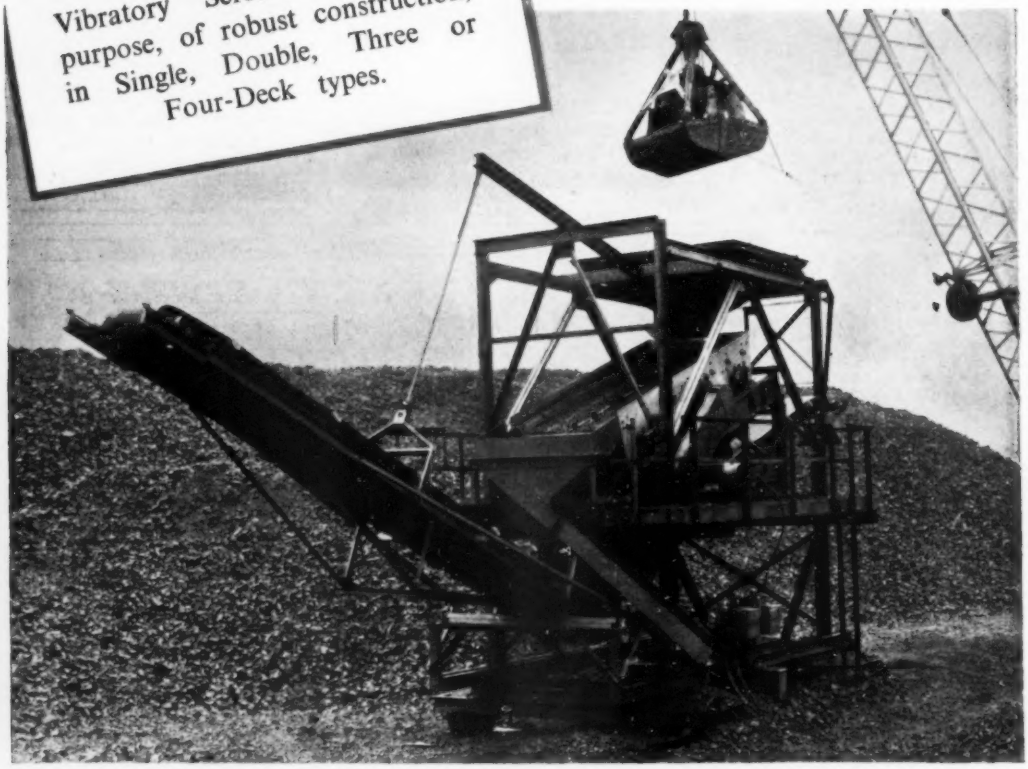
Date.....

Cheques and Post Office Orders to be made payable to:—
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LTD.

C.S.E. VIBRATORY SCREENS

. . . designed to meet your special needs

Vibratory Screens for every purpose, of robust construction, in Single, Double, Three or Four-Deck types.



The above photograph, which is reproduced by permission of the N.C.B., illustrates a Portable Coke Screening Plant in use at the N.C.B. for dealing with 80/100 tons per hour of coke from a stock pile. The vibratory screen shown is one of our 12 ft. x 5 ft. two-deck types.

CRUSHING, SCREENING and ENGINEERING LIMITED

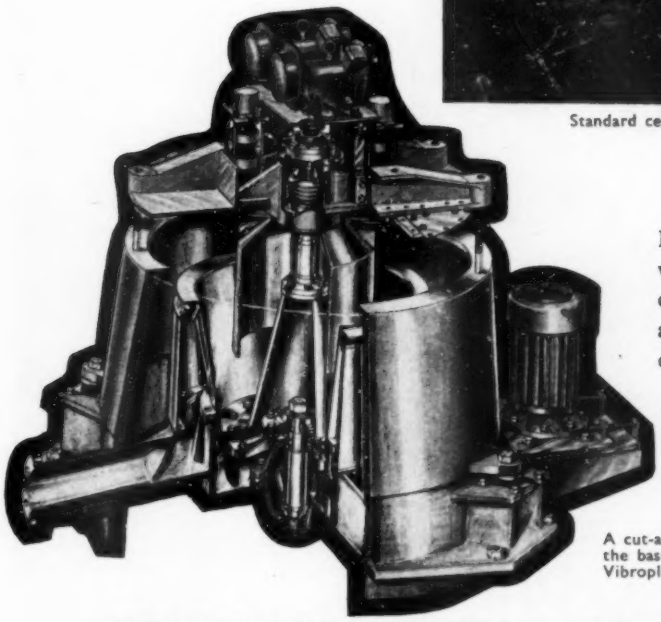
BEDE TRADING ESTATE, JARROW-ON-TYNE. TELEPHONE 897095

fine coal dewatering by

REINEVELD CENTRIFUGES

Increase your gas yield and oven output by using Reineveld Centrifuges for fine coal dewatering. These highly efficient machines obviate all the disadvantages of excessive moisture in coke oven fuel and minimise the deterioration of oven brickwork.

Standard centrifuges being assembled at works.



A cut-away illustration showing the basic construction of a Reineveld Vibroplane centrifuge.

In this country alone, there are well over 200 Reineveld Centrifuges operating satisfactorily treating coal and more machines are in the course of construction.

RHEOLAVEUR GENERAL CONSTRUCTION LTD

ASSOCIATED WITH

JAMES BUCHANAN & SON (LIVERPOOL) LTD

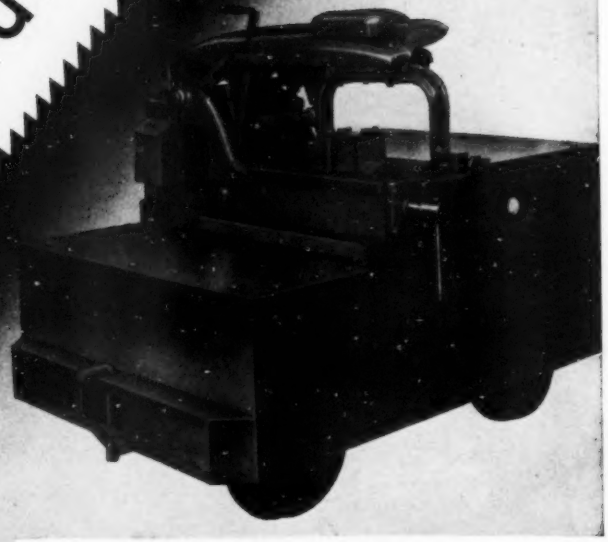
78 LONDON STREET READING PHONE: READING 53436/7

BRANCH OFFICE: GUILDHALL CHAMBERS SANDHILL NEWCASTLE Tel: NEWCASTLE 26781
WORKS: KIRBY AND BOOTLE LIVERPOOL

P. 6671

Siskol..

underground saw unit



A mobile unit powered by compressed air or electric motor for sawing steel underground with safety and speed.

Write for particulars.

siskol machines limited

penistone road · sheffield 6

The

PROTECTOR LAMP

The Finest GAS DETECTOR in the World

TYPE 6
With Flint Relighter
FOR OFFICIALS' USE
(AS ILLUSTRATED)

TYPE S.L.
With Platinum Wire Ignition
FOR WORKMEN'S USE

THE PROTECTOR LAMP & LIGHTING COMPANY LTD

ECCLES, Nr. MANCHESTER
Telephone: ECCLES 3013

* GOING...

GOING...

and nearly GONE!

Only a few copies now remain in stock of the 1960/61 edition of

RYLAND'S

Directory of the Iron, Steel, Metal, Engineering & Hardware Trades and in a few weeks it will be unobtainable at any price

. . . but for the moment a copy can be sent you by return of post on application to . . .

The Publishers,
Ryland's Directory,
17/19 John Adam St.,
London, W.C.2

Price
84/-
(Post free in the U.K.)

STOCKPILE SCREENING

Completely Automatic with dual delivery

The Merer Arrangement 5 Screen simplifies and speeds up stockpile screening. Material fed to the hopper by loading shovel, digger or grab is screened continuously and automatically and delivered at two points approximately 26-30ft. apart for stockpiling or vehicle loading. Outputs of up to 100 tons per hour are being achieved. Power is by diesel engine or electric motor.

MERER

Be fully informed on the range of Merer equipment. Write today.

MERER LIMITED

Dalderse Avenue,
Falkirk, Stirlingshire.
Tel: Falkirk 1624.

"BECANDER"

MAN RIDING HAULERS

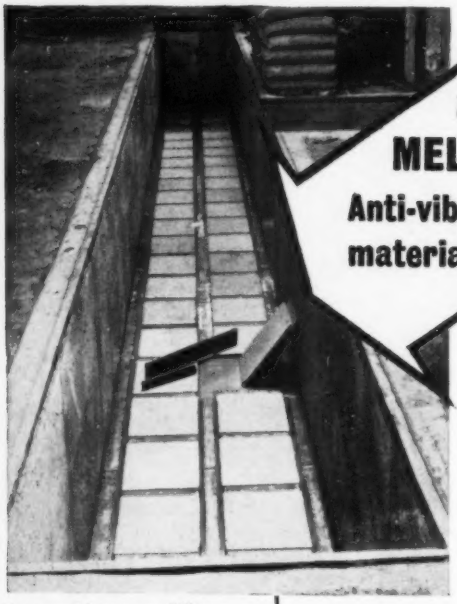
350 H.P. Man Riding Reversible Endless Rope Hauler. Rope Wheel 10'0 dia.
Rope Speed 20 m.p.h. Brake operated by Electro-Hydraulic Thrustor

Date Installed **1940** Man Miles run per annum **1,650,000**

BECKETT & ANDERSON LTD.
DALMARNOCK BRIDGE, RUTHERGLEN, Nr. GLASGOW

Telephone : RUTHERGLEN 1420 *Telegrams : BECANDER GLASGOW*

Ensure the Greatest **SAFETY**



Use
MELLOPAD
Anti-vibration material...

...for incorporation in the concrete foundations of power hammers, drop stamps, foundry jolters to reduce transmission of vibration.

Also for the isolation of precision machines from external disturbances.

The picture shows Mellopad laid in a pit preparatory to casting the concrete block for a precision grinder, capacity 24 ft. x 18" dia.

Write to us for particulars and recommendations.

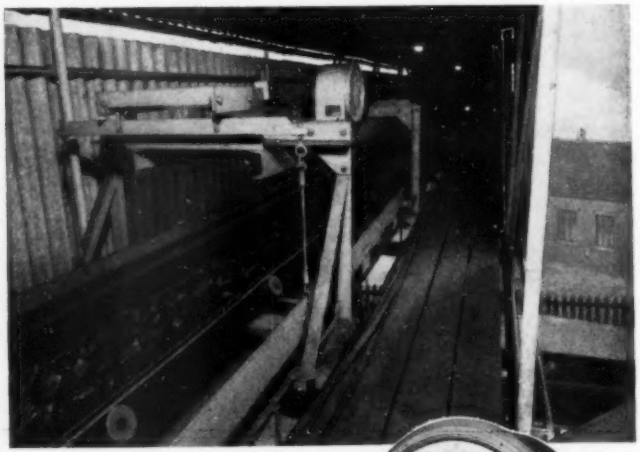
Photograph by courtesy of Messrs. Marfleet & Weight Ltd. Melbourne, Australia.

MELLOWES & CO. LIMITED. SHEFFIELD. 3.

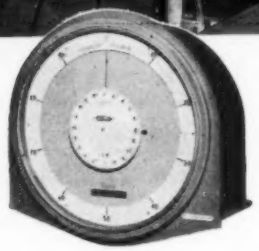
The Blake-Denison
TOTALIZING WEIGHER
for belt conveyors

Original in design
Outstanding in performance

TOTALLY ENCLOSED INDICATOR ●
SELF LUBRICATING ●
SELF CONTAINED UNIT CONSTRUCTION ●



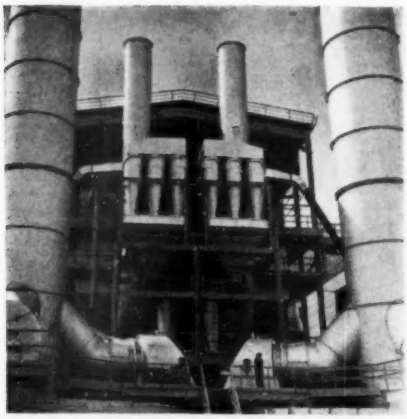
N.C.B. North Eastern Division No.8 Area, Glasshoughton Colliery.

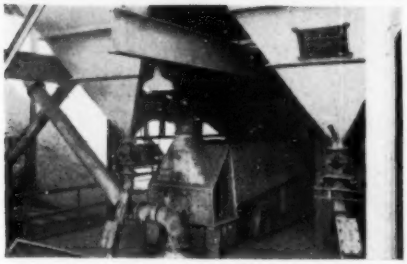


Model 125

SAML. DENISON & SON LTD.
HUNSLET FOUNDRY · MOOR ROAD · LEEDS 10
Tel: Leeds 7-5488 Grams: 'Weigh Leeds 10'

Area Offices at
LONDON SLOane 4628
BIRMINGHAM Midland 3931
MANCHESTER Blackfriars 1986
LEEDS Leeds 2-8433





Dust collection and removal

Buell have the widest experience in the removal and recovery of industrial dusts. Buell High Efficiency Cyclones deal effectively with dusts associated with crushing and screening, rotary kilns, dryers and metallurgical furnaces. Buell Compound Collectors are effective for the elimination of fly ash from boilers etc.

The plants illustrated collect and recover the dust from a large iron-ore sintering plant.

Write for our publication "Dust Collection."

BUELL

Regd. Trade Mark

BUELL LIMITED

(a subsidiary of Edgar Allen & Co. Limited)

THREE ST. JAMES SQUARE · LONDON S.W.1

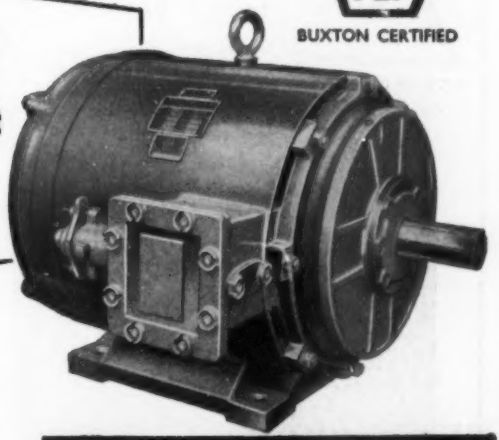
Telegrams: Allentare Piccy, London. *Telephone: Trafalgar 2528 (3 lines)*

B11

Recognised as one of the World's finest mining motors . . .

FLP

BUXTON CERTIFIED



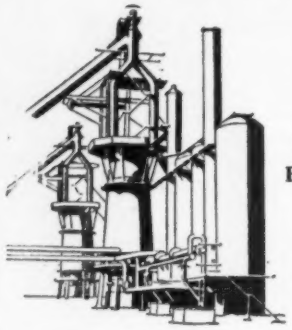
We are specialists in the manufacture of electric motors for the Mining Industry and our motors are renowned for their reliability and high efficiency under arduous conditions. Squirrel Cage, Trislot (high torque) and Slipring types from 1 to 150 h.p. Certified flameproof by Buxton. Illustrated is our Steel Framed High Torque Trislot Motor, 100 h.p. 980 r.p.m.

Horace **GREEN** & CO. LTD

CONONLEY · KEIGHLEY · ENGLAND

Telephone: Crosshills 2201 *Telegrams: 'Green, Crosshills 2201'*

COMPLETED LININGS TO



70 BLAST FURNACES

132 HOT BLAST STOVES

67 STEEL MELTING FURNACES

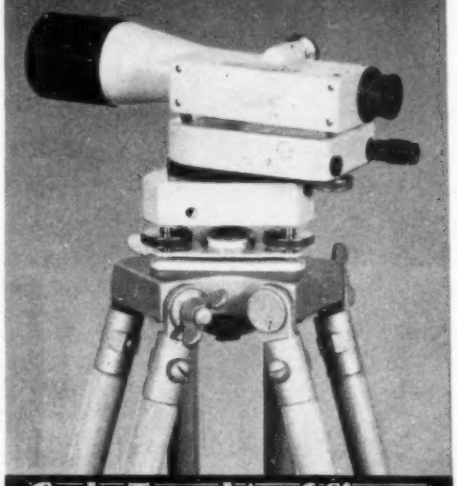
STAFF: 350 MEN, includes -
150 FURNACE BRICKLAYERS

TATTERSALL

REFRACTORY CONTRACTORS

13½ Southfield Road, Middlesbrough.
TEL. 2320

SURVEYOR'S LEVEL
S 330

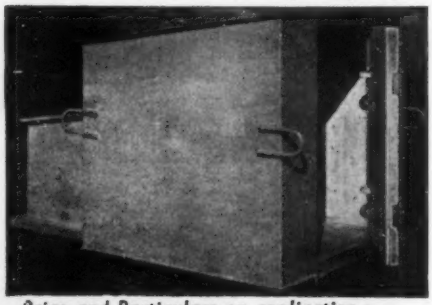


Cooke Troughton & Simms LTD
YORK ENGLAND

SAFETY FIRST

ACCEPTED BY HOME OFFICE

PORTABLE MILD STEEL EXPLOSIVE STORE MAGAZINES and DETONATOR BOXES
to suit any capacity



Price and Particulars on application :—
HORNSBY & GOODWYN LTD.
Constructional Engineers, Steel, Iron, & Brass Founders
Telephone: Scunthorpe 2231 & 2232 (2 lines) SCUNTHORPE, LINCS. *Telegrams:* Machinery, Scunthorpe.

NEW AND SECOND HAND
RAILS
OF ALL SECTIONS
POINTS · CROSSINGS · SLEEPERS
TIMBERS · RAIL FASTENINGS · CHAIRS
PORTABLE RAILWAY AND TIP WAGONS
CHOCKWOOD
CIVIL ENGINEERING AND CONTRACTORS' SUPPLIES
S/H SAWN TIMBER A SPECIALITY

S. RHODES CO. LTD.
Telephone 41327-9. BRIGHTSIDE LANE SHEFFIELD 9 *Telegrams* 'RODESCO' SHEFF
DEPOTS (SHEFFIELD) MILLRACE, BROUGHTON LANE, ECCLESFIELD, (LIVERPOOL) KNOTTY ASH.

£10,000,000 at least has been saved by N·I·F·E·S clients

Savings on fuel bills have averaged 20%

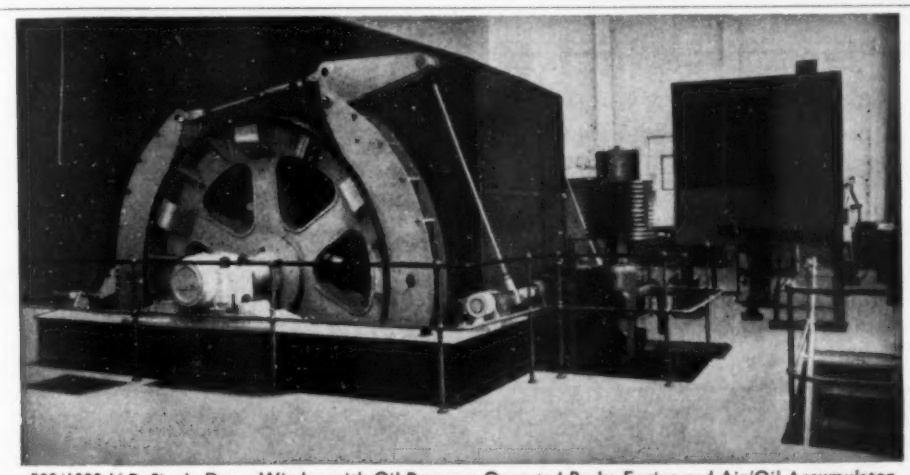
dividends include...increased output from plant
improved quality of products and
better working conditions for staff

N·I·F·E·S is anxious to assist British Industry with all its heat and power problems

YOUR ENQUIRIES ARE INVITED

N·I·F·E·S *National Industrial Fuel Efficiency Service*

71 GROSVENOR STREET LONDON W1 TELEPHONE: HYDE PARK 9706



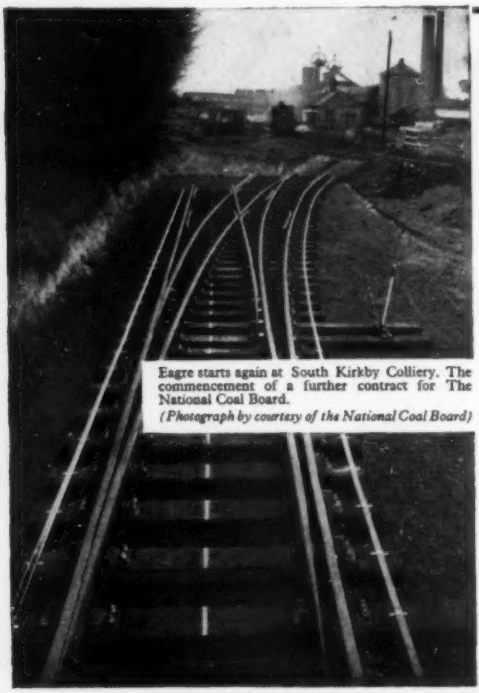
500/1000 H.P. Single Drum Winder with Oil Pressure Operated Brake Engine and Air/Oil Accumulator

**Manufacturers also of Rope-Changing Winches and Capstans,
Man-Riding Haulages, Electric Cable Reelers, etc.**

New Designs a Speciality

THE USKSIDE ENGINEERING COMPANY LTD

NEWPORT A MEMBER OF THE GKN GROUP OF COMPANIES **MON. TEL: 63021**



Eagre starts again at South Kirkby Colliery. The commencement of a further contract for The National Coal Board.
(Photograph by courtesy of the National Coal Board)

for a complete track service

SURVEY **DESIGN**
SUPPLY **INSTALLATION**

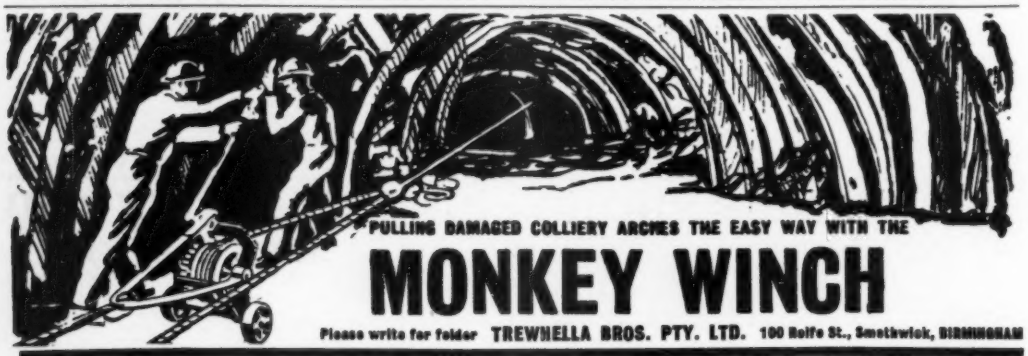
EAGRE

Eagre's skilful planning and practical experience on railway preparation, from earthworks to the finished job, ensures that your scheme can be well and economically laid. Railway material is supplied from Eagre's own resources. Eagre also works for British Railways, the Gas Board, the United Steel Companies, Central Electricity Authority etc. Whatever the magnitude of your siding requirements, consult—

EAGRE CONSTRUCTION CO. LTD.
East Common Lane, SCUNTHORPE, Lincs.
Telephone 4513 (5 lines)
E

MANUFACTURERS OF **MILNERITE** (REGD.)
HIGH PRESSURE SHEET JOINTING
KOBAR (REGD.) **ASBESTOS** PACKING AND **GASKETS**
OF ALL TYPES FOR EVERY SERVICE
ON ADMIRALTY LIST

JAS. MILNE COOPER & CO. LTD.
KOBAR WORKS, BRADFORD, ENGLAND
TELEPHONE: Bradford 44438 *TELEGRAMS:* "Zanoline, Bradford"

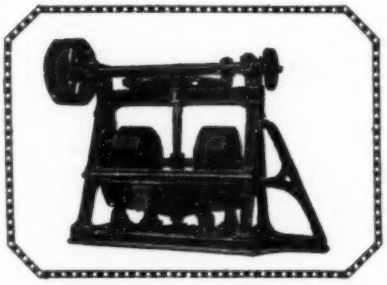


PULLING DAMAGED COLLIERY ARCHES THE EASY WAY WITH THE
MONKEY WINCH
Please write for folder **TREWHELLA BROS. PTY. LTD.** 100 Rolfe St., Smethwick, BIRMINGHAM

WhiteAd 4315

TRADE Smedley MARK

PAN GRINDING MILLS



REVOLVING OR STATIONARY PANS
PERFORATED OR SOLID BOTTOMS
OVER OR UNDER DRIVEN

Smedley Brothers, Ltd.
Belper.
Derbyshire.

Telephone:
Belper 12

FORAKY
BORING

TO ANY DEPTH FOR ANY PURPOSE
Cores down to 6,300 feet.
DIAMOND, CHISEL, SHOT
Boring Completed 1,000 miles

SINKING

BY ANY KNOWN METHOD
BALING, PUMPING, FREEZING
CEMENTATION, SILICATISATION

TUNNELLING

Construction of Watertight Dams, Relining and Repairing of SHAFTS, BRICK, TUBBING, COFFERING AND CONCRETE, &c.

SOLE OWNERS OF THE DENIS-FORAKY
"TELECLINOGRAPH."

FORAKY BORING & SHAFT
SINKING CO. LD.

COLWICK, NOTTINGHAM
Telephone No.: Nottingham 24-6331

MILLOM
HEMATITE

THE
WEST COAST
STANDARD

Millom brand of West Coast Hematite is of unrivalled reputation.
It is "the West Coast Standard."

INGOT MOULDS
Of our usual excellent quality.

REFINED MALLEABLE PIG IRON
Cupola-cast in small pigs — is specially favoured for small malleable castings.

MILLOM MACHINE CAST PIG IRON
free from Sand and Sows.

SPECIAL CYLINDER IRONS
Particularly suitable for Cylinders, Pistons, I.C. Engine parts or other highly stressed components. Special Irons for Rolls.

ANNEALING ORES FOR MALLEABLE TRADE
Crushed and screened to customer's requirements and entirely free from dust.

MILLOM HEMATITE
ORE & IRON Co., Ltd.,
MILLOM, CUMBERLAND
Tel.:—Millom 265, 266 & 267 (3 lines)
'Grams:—"Ironworks," Millom Telex No. 6561
A member of the Cranleigh Group.

INDEX TO ADVERTISERS—*continued from page 82.*

Jenkins, W. J. & Co. Ltd. — Johnson Rolls Ltd. — Jones, W. Stanley (Engineers) Ltd. — Joy, Sullivan Ltd. 51

Kennedy, Allan & Co. Ltd. 54 Kenyon, Wm. & Sons Ltd. —

Lafarge Aluminous Cement Co. Ltd. — Lanarkshire Bolt Ltd. — Lanarkshire Steel Co. Ltd. — Lancaster & Tonge Ltd. — Lane, Francis & J. S. Ltd. — Ledward & Beckett Ltd. — Lever, J. & Sons Ltd. — Lilleshall Co. Ltd. — Lindley, H. Ltd. — Lloyds (Burton) Ltd. — Locker Industries Ltd. — Lodge-Cottrell Ltd. — Lumb, Jas. & Sons Ltd. — Lysaght's, Scunthorpe Works —

Mackley, E. N. & Co. Ltd. — M. & C. Switchgear Ltd. 16 Markham & Co. Ltd. 64 Marley, Wilfred Ltd. — Marshall, Thos. & Co. (Loxley) Ltd. — Martin Black & Co. (Wire Ropes) Ltd. — Massey, B. & S. Ltd. — Mastabar Mining Equipment Co. Ltd. 53 Mather & Platt Ltd. — Matthews & Yates Ltd. — Mavor & Coulson Ltd. — McClure, David Ltd. — Mellowes & Co. Ltd. 74 Merer Ltd. 73 Metalectric Furnaces Ltd. — Michael & Partners Ltd. — Midgley & Son Ltd. — Millom Hematite Ore & Iron Co. Ltd. 79 Mills, James Exors. of — Mine Safety Appliances Co. Ltd. — Mining Engineering Co. Ltd. — Mitchell Ropeways Ltd. — Mobil Oil Co. Ltd. — Mobile Lifting Services Ltd. — Moler Products Ltd. — Mond Nickel Co. Ltd. — "Monitor" Patent Safety Devices Ltd. — Mono Pumps Ltd. — Moorwood, John M. Ltd. — Morgan Refractories Ltd. 26 Morris, Robert Ltd. 6 Mowlem-Centraline — Murex Welding Processes Ltd. — Muschamp, N. J. & Co. Ltd. —

National Boiler & General Insurance Co. Ltd. — National Coal Board — National Industrial Fuel Efficiency Service 77 Neal, R. H. & Co. Ltd. — Needham Bros. & Brown Ltd. —

Nelson, W. & H. Ltd. — New Conveyor Co. Ltd. — Newell, Ernest & Co. Ltd. — Newton Chambers & Co. Ltd. — Niagara Screens & Plant Ltd. — Nife Batteries — Nordberg Manufacturing Co. Ltd. — North British Rubber Co. Ltd. — North Eastern Marine Engineering Co. Ltd. — Northfield Industrial Fabrications Ltd. — Norton Harty Engineering Co. Ltd. — Norton, Sir James Farmer & Co. Ltd. — Nortons Tividale Ltd. —

Oldham & Son Ltd. — Ormerod, Edward & Co. Ltd. 24 Osborn, S. & Co. Ltd. — Oughtibridge Silica Firebrick Co. Ltd. —

Padley & Venables Ltd. — Parkes, Timothy, & Sons Ltd. — Parramore, F. & Sons Ltd. — Parsons, C. A. & Co. Ltd. — Parsons Chain Co. Ltd. 12 Parsons Marine Turbine Co. — Patterson Lamps (1953) Ltd. — Peebles, Bruce & Co. Ltd. — Pegson Ltd. — Permutit Co. Ltd. — P.G. Engineering Ltd. — Pickford, Holland & Co. Ltd. — Pittrail Ltd. — Power-Gas Corporation Ltd. — Power Gas Economy Co. — Power Plant Co. Ltd. — Premier Cooler & Engineering Co. Ltd. — Press, Wm. & Son Ltd. — Price, J. T. & Co. Ltd. — Priest Furnaces Ltd. — Procter Bros. (Wireworks) Ltd. — Prodloy Mining Developments Ltd. — Protector Lamp & Lighting Co. Ltd. 71 Pulsometer Eng. Co. Ltd. 67

Qualter Hall & Co. Ltd. —

Railko Ltd. 46 Railway & General Engineering Co. Ltd. — Ransomes & Marles Bearing Co. Ltd. — Rapid Magnetic Ltd. — Rawlplug Co. Ltd. — Reavell & Co. Ltd. — Reay Brass Foundry Co. Ltd. — Reid Gear Co. Ltd. — Reliance Rope Attachment Co. Ltd. — Renold Chains, Ltd. — Reside, Jas. Ltd. — Revolvo Ltd. — Reyrolle, A., & Co. Ltd. — Rheolaveur General Construction Ltd. 69 Rhodes, S. & Co. Ltd. 76 Rhymney Engineering Co. Ltd. — Richards, Chas. & Sons Ltd. —

Richards Structural Steel Co. Ltd. — Richardsons Westgarth Atomic Ltd. — Richardsons Westgarth (Hartlepool) Ltd. — Ride & Bell Ltd. — Rigley, Wm. & Sons Ltd. — Robertson, W. H. A. & Co. Ltd. — Robey & Co. Ltd. — Rocol Ltd. 62 Rolled Steel Products (London) Ltd. — Ropeways Ltd. — Ross Engineers Ltd. 18 Round Oak Steel Works Ltd. — Ruston & Hornsby Ltd. 1 Ruston-Bucyrus Ltd. —

Sack, Maschinenfabrik, G.m.b.H. — Safety in Mines Developments Ltd. — Salem-Brosius (England) Ltd. — Saunders Valve Co. Ltd. 47 Sentinel (Shrewsbury) Ltd. — Shaw, W. & Co. Ltd. — Sheen (Nottingham) Ltd. — Sheepbridge Equipment Ltd. — Sheffield Twist Drill & Steel Co. Ltd. 17 Sheffield Wire Rope Co. Ltd. — Shell Mex & B.P. Ltd. — Siemens-Schuckert (G.B.) Ltd. — Silvertown Rubber Co. Ltd. — Simon-Carves Ltd. 14 & 15 Simon, Richard & Sons Ltd. — Siskol Machines Ltd. 70 Skefko Ball Bearing Co. Ltd. — Skiningrove Iron Co. Ltd. — Smallman, Jas. W. Ltd. — Smedley Bros. Ltd. 79 Smith & McLean Ltd. — Smith, John (Keighley) Ltd. — Smith, Thos. & Son (Rodley) Ltd. — South Wales Switchgear Co. Ltd. — Spencer-Bonecourt-Clarkson Ltd. — Standall Engineering Co. Ltd. — Stanton & Staveley Sales Ltd. — Steam & Combustion Engineering Ltd. — Steel Co. of Wales Ltd. 21 Steels Engineering Products Ltd. — Steelway Ltd. — Stein & Atkinson Ltd. 55 Stein, J. G. & Co. Ltd. — Stephens Silica Brick Co. Ltd. — Stewarts and Lloyds Ltd. — Stockdale Engineering Co. Ltd. — Stoddard, J. & Sons Ltd. — Stone-Wallwork Ltd. — Stothert & Pitt Ltd. — Strachan & Henshaw Ltd. — Structural Painters Ltd. — Sturdy Electric Co. Ltd. 81 Summerson, Thos. & Sons Ltd. 3 Sutcliffe, Richard Ltd. 7 Sutcliffe, Speakman & Co. Ltd. 20

Tattersall & Sons Ltd. 76 Taylor, F. & Sons (Manchester) Ltd. 42 Tees Side Bridge & Engineering Works Ltd. — Thermal Syndicate Ltd. 4 Thomas (Richard) & Baldwins Ltd. — Thompson, John Conveyor Co. — Thompson, John (Triumph Stokers) Ltd. — Thompson, John, Water Tube Boilers Ltd. — Thompson & Southwick Ltd. — Thornton, B., Ltd. — Thyssen Shaft Sinking Co. Ltd. — Town, Fredk. & Sons Ltd. — Trewhella Bros. (Pty.) Ltd. 78 Tungsten Carbide Developments Ltd. — Turner Bros. Asbestos Co. Ltd. —

Underground Mining Machinery Ltd. — Unifloc Ltd. 8 United Fireclay Products Ltd. 22 United States Metallic Packing Co. Ltd. — United Steel Companies Ltd. — United Wire Works Ltd. 50 Uskside Engineering Co. Ltd. 77

Vallak, G. B. Ltd. — Vaughan Crane Co. Ltd. — Vauxhall Motors Ltd. — Victor Products (Wallsend) Ltd. — Visco Limited —

Wade, Smith & Co. Ltd. — Wailes Dove Bitumastic Ltd. — Walker Bros. (Wigan) Ltd. — Wallacetown Engineering Co. Ltd. — Wallsend Slipway & Engineering Co. Ltd. — Walmsleys (Wigan) Ltd. — Ward, Thos. W. Ltd. — Warner & Co. Ltd. — Wellman Bibby Co. Ltd. — Wellman Smith Owen Engineering Corporation Ltd. 49 West Bromwich Spring Co. Ltd. — Westinghouse Brake & Signal Co. Ltd. 36 West's (Manchester) Ltd. — West's Piling & Construction Co. Ltd. — Westwood, Dawes & Co. Ltd. — Wharton Crane & Hoist Co. Ltd. — Whipp & Bourne Ltd. — White, R. & Sons (Engrs.) Ltd. — Whittaker, C. & Co. Ltd. 67 Wickman Ltd. — Widnes Foundry & Engineering Co. Ltd. — Wigglesworth, F. & Co. Ltd. — Wild, A. G. & Co. Ltd. — Wild, M. B. & Co. Ltd. — Willcox, W. H. & Co. Ltd. — Wincott, G. P. Ltd. — Wolseley Holdings Ltd. — Wombwell Foundry & Engineering Co. Ltd. — Wood, Hugh & Co. Ltd. 13 Woodall-Duckham Construction Company Limited — Woodhouse, Joseph Chains Ltd. 81 Worsley-Mesnes Ironworks Ltd. — Wragg, Thos. & Sons (Sheffield) Ltd. —

Yeadon, Son & Co. Ltd. —

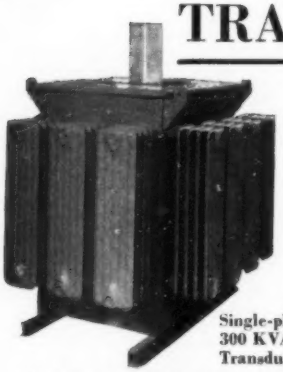
Sturdy

TRANSFORMERS

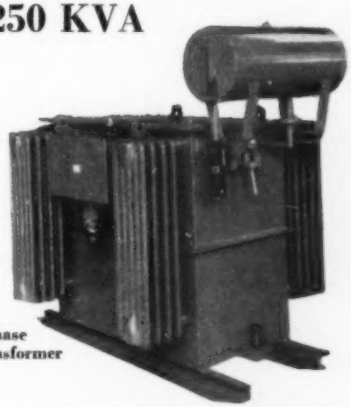
all types up to
250 KVA

TRANSDUCTORS

for control of AC up to
500 KVA



Single-phase
300 KVA (2000 A)
Transductor

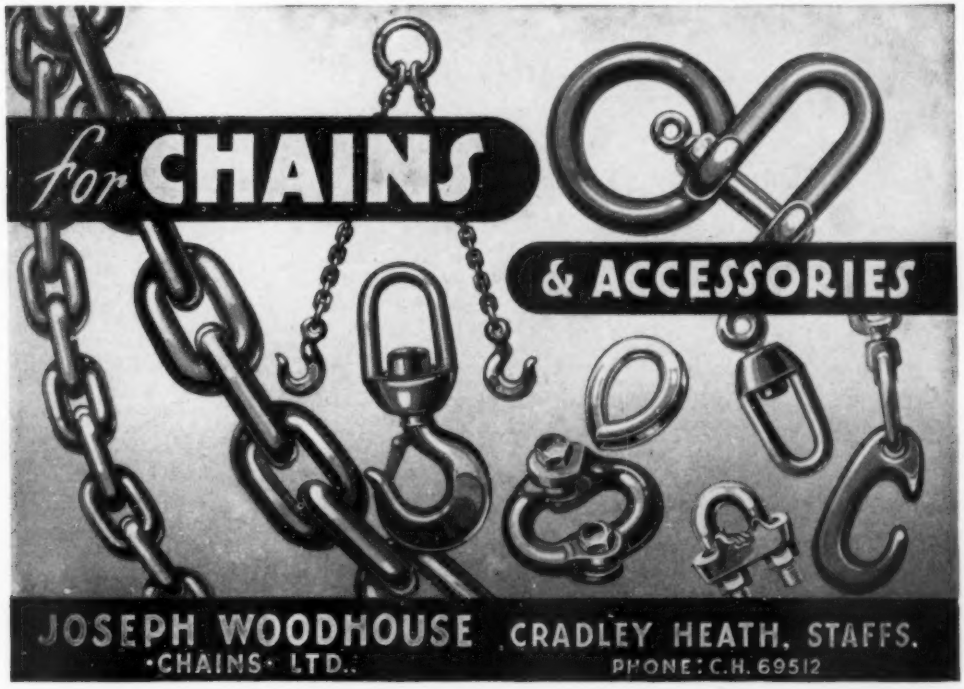


500/440V 3-phase
200 KVA Transformer

STURDY ELECTRIC COMPANY LTD.

STURDY WORKS · HAMSTERLEY COLLIERY · NEWCASTLE UPON TYNE

Telephone : Ebchester 271/2 Telegrams: Sturditran, Newcastle upon Tyne



INDEX TO ADVERTISERS

Adamson Alliance Co. Ltd. .. —
Aerex Ltd. .. .. .. —
Allen, Edgar & Co. Ltd. .. —
Allen, W. G., & Sons (Tipton) Ltd. .. .. .. —
Allen West & Co. Ltd. .. 39
Allis-Chalmers (Great Britain) Ltd. 25
Anchor Chain Co. Ltd. .. —
Anderson, Boyes & Co. Ltd. .. —
Angus, Geo. & Co. Ltd. .. —
Appleby-Frodingham Steel Co. .. .. .. —
Armstrong-Whitworth (Metal Industries) Ltd. .. .. —
Armytage & Sons Ltd. .. —
Arrol, Sir Wm. & Co. Ltd. .. —
Ashmore, Benson, Pease & Co. Ltd. .. .. .. —
Ashworth, E. & A., Ltd. .. —
Associated British Machine Tool Makers Ltd. .. .. —
Associated Electrical Industries Ltd. (Electronic Apparatus Division) .. —
Associated Electrical Industries Ltd. (Heavy Plant Division) 56
Associated Electrical Industries Ltd. (Instrumentation Division) .. .. —
Associated Electrical Industries Ltd. (Motor & Control Gear Division) .. —
Associated Electrical Industries Ltd. (Switchgear Division) .. .. —
Associated Electrical Industries Ltd.-(Traction Division) —
Associated Electrical Industries Ltd. (Transformer Division) .. .. —
Associated Electrical Industries Ltd. (Turbine Generator Division) .. .. —
Atlas Copco (G.B.) Ltd. .. —
Aurora Gearing Co. (Wilmot North) Ltd. .. .. —
Austin, Jas. & Sons (Dewsbury) Ltd. .. .. —
Auto-Klean Strainers Ltd. .. —
Automatic Coal Cleaning Co. Ltd. .. .. .. —
Aveling-Barford Ltd. .. .. —

Bagnall, W. G. Ltd. .. .. —
Bairds & Scottish Steel Ltd. .. —
Barker, Davies & Co. .. —
Barlow & Chidlaw Ltd. .. —
Barnes & Bell Ltd. .. —
Barrow Ironworks Ltd. .. —
Bathgate, Richard A. .. —
Bayliss, Jones & Bayliss Ltd. —
Beckett & Anderson Ltd. .. 73
Becorit (G.B.) Ltd. .. .. —
Beldam Asbestos Co. Ltd. .. —
Belliss & Morcom Ltd. .. —
Belmos Co. Ltd. .. .. —
Beresford, Jas. & Son Ltd. .. —
Birkett, Billington & Newton Ltd. .. .. —
Birlec-Efco (Melting) Ltd. .. —
Birtley Engineering Ltd. .. 43
Blacks Mining Equipment .. 57
Blandford-Gee Cementation Co. Ltd. .. .. —
Blantyre Engineering Co. Ltd. —
Bolton Gate Co. Ltd. .. —
Bonser Tristram Ltd. —
Boyles Bros. Drilling Co. Ltd. —
Bradley, J. & Co. (Stourbridge) Ltd. .. .. —
Bradley Pulveriser Co. Ltd. .. —
B.R.D. Co. Ltd. 31
Brightside Foundry & Engineering Co. Ltd. .. .. —
British Belting & Asbestos Co. Ltd. 41
British Electrical Repairs, Ld —
British Iron and Steel Federation .. .. .. —
British Jeffrey Diamond Ld. 27
British Nylon Spinners Ld. .. —
British Oxygen Co. Ltd. .. —
British Paints Ld. .. .. —
British Resistor Co. Ld. .. —
British Rollmakers Corporation Ld. .. .. .. —
British Ropeway Engineering Co. Ld. .. .. .. —
British Steam Specialties Ld. —
British Timken Division of the Timken Roller Bearing Co. .. .. .. —
Broadbent, Thos. & Sons Ld. —
Brown, David Corporation (Sales) Ld. .. .. —
Brush Electrical Engineering Co. Ld. .. .. .. —
Brymbo Steel Works Ld. .. —
B.T.R. Industries Ld. .. 9
Buell Ld. 75
Burnand, W. E. & Son Ld. .. —
Burnside, George Ld. .. —
Burtonwood Eng'g. Co. Ld. .. —
Bushing Co. Ld. .. .. —

Cable Belt Ld. .. .. .. —
Calomax (Engineers) Ld. .. —
Carblox Ld. .. .. .. —
Cascade Water Coolers Ld. .. —
Case, J. I. Co. Ld. .. .. —
Cast Basalt Products Ld. .. —
Ceag Ld. .. .. —
Cementation Co. Ld. .. .. —
Chloride Batteries Ld. .. —
Churchill Machine Tool Co. Ld. —
Clarke, Chapman & Co. Ld. .. —
Clark, Geo. & North Eastern Marine (Sunderland) Ld. .. —
Clayton Equipment Co. Ld. .. —
Cleveland Bridge & Engineering Co. Ld. .. .. —
Cohen Bros. (Electrical) Ld. —
Cohen, Geo. Sons & Co. Ld. .. —
Colvilles Ld. .. .. .. —
Conflow Ld. .. .. .. —
Consett Iron Co. Ld. .. —
Consolidated Pneumatic Tool Co. Ld. .. .. .. —
Cooke, Troughton & Simms Ld. 76
Cooper, Jas. Milne & Co. Ld. 78
Cooper Roller Bearings Co. Ld. —
Coppee Co. (Gt. Britain) Ld. 45
Cotterill, Herbert Ld. .. —
Coulson, M. & Co. Ld. .. —
Courtaulds Ld. 60
Cowlishaw, Walker & Co. Ld. —
Cox & Danks Ld. .. .. —
Crawley Industrial Products Ld. .. .. 32 & 33
Cripps, R. & Co. Ld. 30
Croda Ld. .. .. .. —
Crofts (Engineers) Ld. .. —
Crompton & Harrison Ld. .. —
Crompton Parkinson Ld. .. 44
Crone & Taylor Ld. .. .. —
Crushing, Screening & Engineering Ld. 68
Curtis, A. L. (Onx) Ld. —

Davenport Engineering Co. Ld. .. .. —
Davey, Paxman & Co. Ld. .. —
Davis, John & Son (Derby) Ld. .. .. —
Davy & United Engineering Co. Ld. .. .. .. —
Davy & United Instruments Ld. .. .. —
Davy & United Roll Foundry Ld. 2
Dawson & Downie Ld. .. —
Demag A.G. .. .. .. —
Demolition & Construction Co. Ld. .. .. .. —
Denison, Samuel & Sons Ld. 74
Distington Engineering Co. Ld. .. .. .. 58 & 59
D.M.M. (Machinery) Ld. .. —
Dobson, W. E. & F. Ld. .. 34
Dollery & Palmer, Ld. .. 10
Donkin, Bryan Co. Ld. .. —
Dorman Long & Co. Ld. .. —
Dougall, James & Sons Ld. .. —
Dowty Mining Equipment Ld. —
Dunlop Rubber Co. Ld. .. —
Dust Suppression Ld. .. 29

Eagre Construction Co. Ld. .. 78
Edge & Sons Ld. .. .. —
Eickoff, Gebr. .. .. .. —
Eimco (Gt. Britain) Ld. .. —
Elastic Rail Spike Co. Ld. .. —
Elcordia Ld. .. .. .. —
Electrical Development Association .. .. —
Electric Furnace Co. Ld. .. —
Electroflo Meters Ld. .. —
Electro-Hydraulics Ld. .. —
Ellis, A. & Sons (Wakefield) Ld. .. .. .. —
English Drilling Equipment Co. Ld. .. .. .. —
English Electric Co. Ld. .. —
English Steel Corporation Ld. 40
Evans, Joseph & Sons (Wolverhampton) Ld. .. .. —
Ewart Chainbelt Co. Ld. .. 67

Fearnehough, W. Ld. .. —
Felco Hoists Ld. .. .. —
Fenner, J. H., & Co. Ld. .. 35
Fielding & Platt Ld. .. —
Finlay Engineering Co. Ld. .. —
Firth, Thos. & John Brown Ld. —
Firth-Vickers Stainless Steels Ld. .. .. —
Fisher & Ludlow Ld. .. —
Flame Hardeners Ld. .. —
Fletcher, Geo. Ld. .. —
Follsain-Wycliffe Foundries Ld. 5
Foraky Boring & Shaft Sinking Co. Ld. 79
Forster, T. S. & Sons Ld. .. —
Foster, H. Johnson Ld. .. —
Foster, Henry & Co. Ld. .. —
Foundry Services Ld. .. —
Fowler John & Co. (Leeds) Ld. 38
Fuel & Metallurgical Processes Ld. .. .. .. —
Fullerton, Hodgart & Barclay Ld. 23

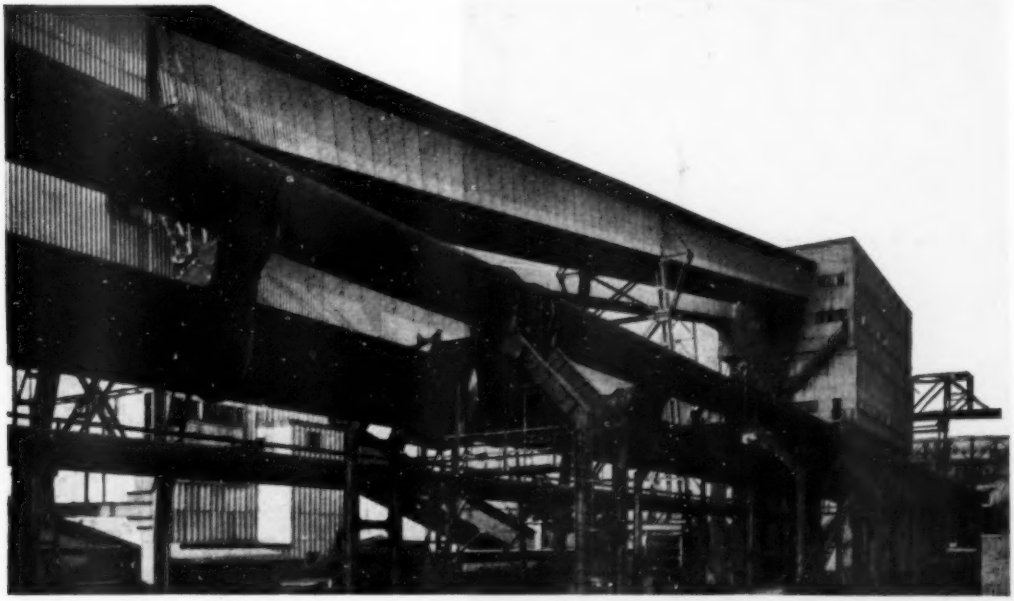
Gas Council 84
General Electric Co. Ld. .. 65
General Refractories Ld. .. 57
Gent & Co. Ld. .. .. —
Gibbons Bros. Ld. .. .. —
Gibbons (Dudley) Ld. .. —
Glover Bros. (Mossley) Ld. .. 48
Glover, Wm. Jas. & Co. Ld. 19
Goodall, Clayton & Co. Ld .. —
Goodyear Tyre & Rubber Co. Ld. .. .. —
Green, E. & Sons Ld. .. —
Green, Horace & Co. Ld. .. 75
Greening, N. & Sons Ld. .. —
Guest, Keen Iron & Steel Works 52
Gullick Ld. .. .. .. —
Gutehoffnungshutte Sterkrade 10

Hackbridge & Hewittic Electric Co. Ld. .. .. .. —
Hadfields Ld. .. .. —
Halesowen Steel Co. Ld. .. —
Hall Bros. (West Bromwich) Ld. .. .. —
Hallamshire Steel Co. Ld. .. —
Hanmade Conveyor Co. Ld. .. 61
Hardman, E. Son & Co. Ld. .. —
Harland Engineering Co. Ld. —
Harlow, Robt. & Son Ld. .. —
Harvey, G. A. & Co.(Ldn.)Ld. —
Hastie, Bernard & Co. Ld. .. —
Hatchett & Co. Ld. 83
Hayden-Nilos Ld. .. .. —
Head, Wrightson & Co. Ld. —
Head, Wrightson Minerals Engineering Ld. .. .. —
Head, Wrightson Machine Co. Ld. .. .. .. —
Head, Wrightson Teesdale Ld. .. .. —
Heap, Joshua & Co. Ld. .. —
Heeley (Mining Machinery) Co. Ld. .. .. .. —
Hick, Hargreaves & Co. Ld. —
Hill, Richard Ld. .. .. —
Hills (West Bromwich) Ld. .. —
Holman Bros. Ld. .. .. —
Holmes, W. C. & Co. Ld. .. —
Holroyd, John & Co. Ld. .. —
Honeywell Controls Ld. .. —
Hopkinson, A. & Co. Ld. .. —
Hornsby & Goodwyn Ld. .. 76
Hoy, Austin & Co. Ld. .. —
Hudswell, Clarke & Co. Ld. —
Humber Graving Dock and Engineering Co. Ld. .. —
Hunslet Engine Co. Ld. .. —
Huntington, Heberlein & Co. Ld. .. .. —

Iliffe Books Ld. .. .. —
Imperial Chemical Industries Ld. 11
Incandescent Heat Co. Ld. —
International Combustion Products Ld. .. .. —
International Construction Co. Ld. 28
International Harvester Co. of Great Britain Ld. .. —
Intrafor Mining Engineers Ld. —

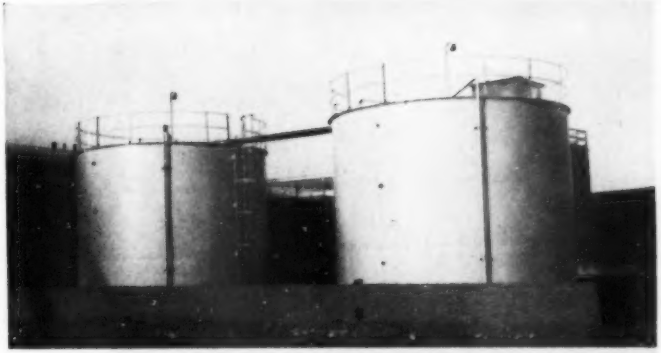
(*Continued on page* 80)

Published by the Proprietors INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LIMITED, John Adam House, 17/19, John Adam Street, London, W.C.2, and Printed in Great Britain, by HARRISON & SONS, LIMITED, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.



HATCHETT

ALL-WELDED GAS MAINS, SUPPORTS and STORAGE TANKS



- COMPLETELY WELDED STEEL STORAGE TANKS OF ALL DESCRIPTIONS.
- STEEL VESSELS FOR THE OIL, GAS, CHEMICAL, ELECTRICAL AND OTHER INDUSTRIES.
- AIR RECEIVERS. PRESSURE VESSELS.
- SPECIALISTS IN LARGE DIAMETER DEVELOPED TUBING.
- STEEL CHIMNEYS AND HEAVY STEEL DUCTING.
- HOPPERS AND CHUTES. BEDPLATES.

HATCHETT & CO. LTD.

Telephone: Hyde 3591/2/3.

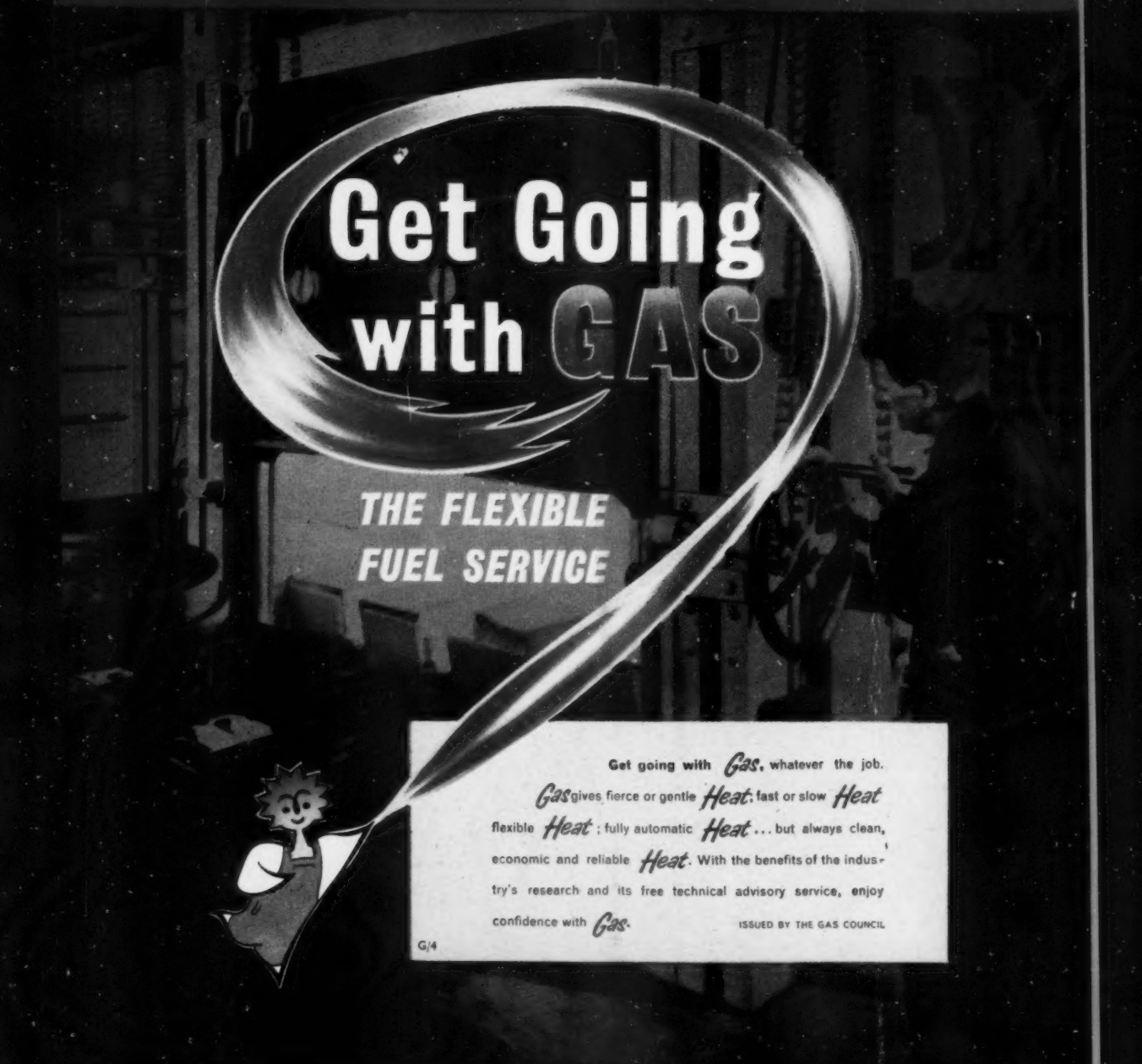
KINGSTON WORKS, HYDE, CHESHIRE

Telegrams: "HATCHETT, HYDE"

IRON & COAL

THE IRON AND COAL TRADES' REVIEW

VOL. 193 No. 4981 Offices: John Adam House, 17-18, John Adam Street, London, W.C.2 LONDON: FRIDAY, SEPTEMBER 15, 1961 Registered as a Newspaper. Single copies 1s. By post 1/4 Ann. Subs.: 52s. (Abroad 60s.)


Get Going with GAS
THE FLEXIBLE FUEL SERVICE
Get going with Gas, whatever the job. Gas gives fierce or gentle Heat; fast or slow Heat flexible Heat; fully automatic Heat... but always clean, economic and reliable Heat. With the benefits of the industry's research and its free technical advisory service, enjoy confidence with Gas.
ISSUED BY THE GAS COUNCIL
G/4